



## RTT TECHNOLOGY TOPIC December 2015

### Terrorism and Telecoms

The 2015 World Radio Congress, tasked with establishing spectrum policy for the next four years, finished last week in Geneva. In parallel, the 3GPP RAN standards meeting in Anaheim has been finalizing the core parts of Release 13 of the LTE standard.

Neither process seems particularly important when compared to the news from Paris and Mali but there are technology links, both positive and negative, between telecommunications and terrorism which give pause for reflection and have a bearing on future telecoms technology policy.

The speed at which a discarded mobile phone in Paris provided French police with a fix on the location of the terrorist ring leaders demonstrated how effective and efficient phone tracking has become. The smart phone has become a double edged sword for anyone intent on doing anything lethally illegal.

More fundamentally (no pun intended), it would be useful if telecommunications could play a more active role in removing the root causes of terrorism rather than just being a useful forensic tool. In this month's technology topic, we explore what this might mean in terms of future spectrum and standards policy.

#### Read on

In July 2015, the United Nations issued a final report on the Millennium Development Programme. Established by the UN in September 2000, the 15 year programme had eight defined goals covering poverty, education, gender equality, child mortality, maternal health, disease, the environment and global partnership.

Progress has been made with the UN able to claim that one billion people have been lifted from extreme poverty. This still leaves 795 million people under nourished. Over 50% of the world's one billion extremely poor people live in five countries, India, Nigeria, China, Bangladesh and the Democratic Republic of the Congo. The number of people displaced by war and regional conflicts is at its highest level since the Second World War. The Millennium Development Goals are being replaced by another 15 year Programme of Sustainable Development goals grouped into six 'essential elements'- dignity, people, planet, prosperity, justice and partnership.

The ITU 2015 ICT statistics report highlights the present reality that over 4 billion people remain off line. Fixed broadband penetration in Africa is less than 1%. Mobile broadband penetration in Africa is below 20% compared to more than 80% in Europe. There are more than one billion people living in Africa, a population that has doubled in size in less than thirty years. It is geographically huge, over 30 million square kilometres, more than the combined geographic area of the US, Argentina, India, Western Europe and China. Rural delivery economics in Africa are therefore uniquely challenging.

The same challenge applies to the economics of other utilities considered essential in developed economies including clean water and electricity. 600 million people in Africa have no access to mains electricity. This creates a related challenge for telecommunications including mobile connectivity and highlights a particular need for power efficient RF base stations that can run off solar or wind or diesel power and user and IOT devices that can run off AA batteries or solar rechargeable cells.

It is not just a question of size but of population density, population distribution, wealth and wealth distribution. Australia is a large country of 7.6 million square miles with a relatively small (33 million) but rich (\$67,000 GDP per capita) population. Ethiopia, one of the economic success stories of Africa with growth rates of nearly 10% for the last ten years has an average GDP per capita of \$315 dollars. Ethiopia and many other African countries remain vulnerable to drought and crop failure and famine. Economic success in Africa has an underlying rural fragility.

Over 13% of the people in China, 47.5% in Sub Saharan Africa, 36% in South Asia, 14% in East Asia and the Pacific, 6.5% in Latin America and the Caribbean earn less than one dollar per day, a total of 1.3 billion people.

Fifty years ago, after four years as Prime Minister, Julius Nyerere was elected president of Tanzania with a political commitment to create an egalitarian socialist society based on cooperative agriculture. This involved collectivising farmlands, a mass literacy campaign and free and universal education with an emphasis on achieving economic self-reliance - grow and make what you can and trade the rest. The project was named *ujamaa*, the Swahili for family hood and was based on economic cooperation and racial and tribal harmony.

Africa is not a country but a continent and there are large cultural differences from country to country and region to region. Tanzania has 120 tribes making the country intrinsically diverse. Kenya has three tribes making stability harder to achieve.

At the end of Nyerere's presidency in 1985, Tanzania was still one of the world's poorest countries, with a per capita income of US\$250 and a third of the national budget reliant on foreign aid. Agriculture remained at subsistence level and industrial and transportation infrastructures were chronically underdeveloped. However the country had one of the highest literacy rates in Africa and was remarkably free of economic inequality and was, crucially and not coincidentally, politically stable. Tanzania compared to Kenya and many other African countries is a significantly peaceful place. The Central African Republic, just visited by the Pope, has had 55 years of political instability.

In terms of the original ambition, *ujamaa* in Tanzania failed but can be regarded as a good idea ahead of its time. In particular fifty years on, Africa has potential access to IOT connectivity technologies that could revolutionise agriculture and access to communication technologies that could provide efficient mechanisms for delivering literacy and numeracy. The success of M-PESA and related micro transaction economic initiatives is a step in the right direction towards a more universal economic and social and political transformation.

But you cannot sell \$500 dollar smart phones and \$50 dollar a month contracts to agricultural workers earning a dollar a day.

The problem is acknowledged in 5G standards wish lists that state an ambition to reduce device and delivery cost by 'orders of magnitude' but it is presently difficult to see how this could be achieved. The problem with the present spectrum and standards process is that it remains inherently focused on urbanised developed economies.

Low cost rural mobile broadband connectivity is part of the advocacy case for co-sharing UHF broadcasting spectrum. Some harmonisation progress has been made at WRC with the 700 MHz band but differences in band plans between the US, Asia and Europe and Africa will continue to frustrate global scale economy.

In Anaheim, Release 13 disputes over low cost low power budget IOT physical layer specification have been partially resolved by combining parts of two competing proposals. While pragmatic, the compromise specification will make it harder to deliver 3GPP IOT devices into cost sensitive and energy sensitive agrarian applications.

In user devices, the complexity required to support high data rates, for example carrier aggregation, MIMO antennas, high performance digital signal processing, highly specified RF components and complex higher layer protocols, results in non-recurring engineering and test costs which have to be recovered from product and service pricing.

Add in escalating spectral costs including annual license fees and it is hard to avoid the conclusion that mobile broadband connectivity is becoming more expensive rather than less expensive over time – the digital divide is getting wider.

There are of course options other than 3GPP LTE and options other than licensed spectrum including rural wide area Wi-Fi and /or Wi-Fi from the sky and/or the repurposing of legacy technologies. The re-use of GSM channels and modem architectures for low cost IOT is one example.

However if there is one single aspiration that should be embedded in the 4G to 5G transition process then surely it should be to produce a global standard that can scale to global markets across the whole spectrum of global price points. This includes an ability to build sparse networks that can meet the per bit delivery cost requirements of sub ten and sub one dollar per day demographics and a standards process that can yield user and IOT devices that anyone and everyone can afford to buy and use.

Given that the 5G standards process and technology time lines are similar to the United Nations Sustainable Development Programme (a 15 year cycle), it seems to make sense to align telecommunications spectrum and standards policy with global social and economic policy. In the context of this global policy process, economic deprivation is often cited as the root stock of disaffection and the feed stock of radicalisation. However the problem is inequality not poverty.

Telecommunications technology, including mobile communications technology, has the ability to make the world more economically equal. Equality is not the same as prosperity and is not the same as fairness but fairness is subjective and hard to measure and it is equality that provides the surest route to political and social stability.

It seems as though the French were right all along. "Liberté, Egalité, Fraternité, but let's avoid the guillotine this time round.

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