RTT TECHNOLOGY TOPIC
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Technopolies

Technodiversity or technopoly?
You might expect that a shift to technology neutrality in spectral allocation and auction policy, the notion of 'letting the market decide' would result in an increase in the choice and number of technologies deployed.

Counter intuitively and anecdotally the opposite is happening.

Partly this is a consequence of our present position in the telecommunications recessionary cycle.

In a recession, early and ruthless decisions have to be taken as to which technologies will succeed and which will fail.

The hedging of technology bets incurs insupportable opportunity cost.

Additionally, available R and D resource naturally gravitates towards technologies that are already well established.

The choice of investing in products that ship into established markets or developing products and services for markets that do not yet exist and therefore by definition have no proven volume or value is easy. You have to avoid avoidable risk.

Similarly the dominant determinant of any new choice of technology is that it should maximise return on **existing** R and D and manufacturing investment.

Backwards compatibility with existing systems therefore becomes essential.

This is true for all levels of the industry supply chain including RF components, radio and baseband silicon, infrastructure and end user product and service offerings.

We call this the **technopoly effect, the de facto development of a single dominant technology.**

Effectively we would appear to be moving towards a technopoly across most present communication systems at least at the physical layer. A de facto ADSL/VDSL technopoly has been established in copper access; DVB- T is a technopoly in most countries outside of the US, digital cellular has probably always been a technopoly but some people in some companies chose to ignore the obvious.

Where physical layer technopolies do not exist or have not existed to date, mobile TV and UWB being two examples, it has proved impossible to achieve sustainable

market volume and value.

The same transition is happening in the upper layers of communication protocol stacks as internet protocols become more widely adopted. The internet and the World Wide Web are technopolistic, the basis of their success.

The cost benefits of a technopoly
A strong argument can be made that technopolies are universally beneficial.

Technopolies are however particularly beneficial when applied to radio communication systems.

This is because radio communication physical layer technopolies improve spectral **economic** efficiency.

Spectral **economic** efficiency is of course a much broader term than spectral efficiency.

Spectral economic efficiency embraces all spectrally related costs including standards making, component and system level R and D, manufacturing investment and through life technology support cost.

Standards making absorbs hundreds of thousands of man hours of expensive time.

The purpose of standards making when properly applied should be to provide a precise description and working model of a technology that does not exist commercially but is known to be commercially realisable within a certain time scale. This process is sometimes known as technology interception.

In radio systems, the need for interoperability between products and services requires the technology to be described at the physical layer to bit level at base band and to dB level on the radio side.

This process takes at least five years. Products that conform to the standard then need to be designed. Products that conform to the standard then need to be manufactured.

In present market conditions, the notion of being able to support multiple technologies each requiring separate standardisation processes is close to inconceivable.

The performance benefit of a technopoly
Interestingly, also, the focusing effect of a technopoly means that R and D will be or should be more efficiently and effectively applied.

This means that over time user product functionality should improve faster thereby increasing realisable user value. One example would be power drain in mobile devices, a DC per bit performance metric.

In radio systems, performance gain, specifically improved stability, sensitivity and selectivity translates directly into efficiency gain, more megabits per MHz per cell per

sector.

Do technopolies only occur in recessionary conditions?
Not necessarily though they are a likely consequence. In periods when an industry is expanding, hedging technology bets is more affordable and avoids painful decision making though even in these conditions this is probably not good management practice.

How will technopolies develop in future?
Our thesis is that technopolies provide a de facto mechanism for amortising standards making, R and D and manufacturing investment over a broader market. This reduces final product cost.

The focusing of R and D effort also results in performance improvements that translate into additional user value and an increase in spectral economic efficiency.

The obvious next step is to extend technopolies across presently separate markets.

In particular, the adoption of OFDM in LTE brings the cellular industry much closer to the broadcast industry in terms of radio access technology.

This provides an obvious basis for a cross industry technopoly that would realise significant and probably essential cost reduction and performance enhancement opportunities.

Similar de facto cross industry technopolies are occurring or will occur in display technologies and next generation memory platforms and batteries and of course battery charging (hurrah).

However spectral cost increases the return achievable from radio access technopoly and suggests this is where the biggest potential competitive advantage is likely to occur.

So generally technopolies are a good thing and a necessary mechanism for reducing cost and improving product performance. They are particularly appropriate and useful for radio systems that have to realise value from over priced over valued spectrum.

The existence of a technopoly does not imply monopoly. Any and all companies can gain equal benefit from a technopoly provided they follow the rules and do not dilute R and D and manufacturing effort on areas with unestablished market scale.

This is particularly true in a recession but probably true across all stages of a telecommunications business cycle.

The same principles apply to countries that decide to deliberately create their own nationally specific technopolies.

For this to work you need political will, a command economy and a massive domestic market. China and India may qualify. The US or Europe do not. It is a pretty dumb idea to artificially create a technopoly. The strongest technopolies are the ones that

grow organically over time.

Cross industry technopolies will be the next big thing and LTE and DVB T convergence will be an early example, with probably more to follow.

Technodiversity and bio diversity in the natural world -strength in similarity
And finally -technopolies appear to act in a way that is directly opposite to the way in which the natural world is organised.

In the natural world, the usual assumption is that strength comes from bio diversity.

However this may be an illusion.

As DNA sequencing becomes more sophisticated, we are realising that differences between animals and species and plants are less dramatic than originally assumed

A mouse is a man with minor modifications (or is it the other way round?).

Similarity may be the essence of survival.

About RTT Technology Topics

RTT Technology Topics reflect areas of research that we are presently working on.

We aim to introduce new terminology and new ideas to clarify present and future technology and business issues.

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Contact RTT

RTT, the Shosteck Group and The Mobile World are presently working on a number of research and forecasting projects in the cellular, two way radio, satellite and broadcasting industry.

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