GUEST EDITORIAL: THE SURGE AND CONSEQUENCES OF ANYWHERE BROADBAND

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Copper, steel, silver, gold, coal and iron ore are traditionally regarded as being amongst key physical commodities upon which world prosperity has largely been built. The growing currency of today is information, and as a number of papers in this Issue effectively reaffirm, broadband by various means is increasingly showing itself to be a key building block and productivity tool for the emerging new world economy.

Much has been written already on the general topic of broadband. This Issue of the TJA looks particularly at the very rapid Australian and international growth of **wireless broadband** as a growing part of that story. It explores market trends, applications, innovation, government policy, regulation, technology and radio spectrum issues. In the process it also re-visits debate on the ability or otherwise of current and foreseeable wireless technologies and spectrum arrangements to support and sustain this observed rapid growth, now and into the future.

Whilst the term 'wireless broadband' is commonly used in the industry, the mass market appears more comfortable with terms like 'wireless Internet', but that is only part of the story because of other wireless broadband developments, including those supporting Machine-to-Machine (M2M) communication. Formal definitions of wireless broadband (as for broadband generally) vary widely around the world but usage of that term in this Issue refers generally to the supply or consumption of broadband capacity by wireless means. From a user perspective this includes availability of a fast growing range of end-user devices (including iPhones, iPads, and an expanding competitive range of Android and other alternative phone and device types). It further includes fixed and portable wireless broadband equipment to extend access to local or national broadband networks (such as described for the Australian National Broadband Network (NBN) or New Zealand's Rural Broadband Initiative), broadband satellite systems, WiFi access systems, and though not specifically discussed in this Issue, the evolving new area of Near-Field Communication (NFC) devices, such as deployed in Google's new 'payment app' intended to replace a wallet full of credit cards.

Wireless broadband is very much an international story and is best studied in that context. It is therefore pleasing that a number of key international as well as local stakeholders have accepted the TJA's invitation to contribute papers on this significant topic. There are other useful references as well.

THE SURGE IN TAKE-UP OF WIRELESS BROADBAND

In their Australian 'State of the Market' analysis of November 2011 Nielson Online Ratings reported a 71% increase of online browsing via Australian mobile devices in 2011. The analysis further revealed that this growth was not just from young people who in the past have tended to lead the innovation charge, but in fact that 41% of smart-phone users are now over 40 years old.

In July 2011 the OECD Programme for International Student Assessment (PISA) published a report based on 2009 data showing that for member nations Korea tops the scale for usage of computers and the Internet for learning by 15 year olds. The next best performers in descending order were New Zealand, Australia, Japan, Hong Kong China and Iceland. Mobile devices are increasingly being used by students in addition to fixed access, as previously reported in the TJA.

South Korea has long been at the forefront of broadband policy and implementation, and according to June 2011 OECD figures has the highest OECD wireless broadband subscriptions per 100 inhabitants, followed in order by Sweden, Japan, Finland, Norway, Denmark, the US and Australia. In terms of overall broadband penetration. Korea closely follows Netherlands, Switzerland and Denmark; and Australia is just above average. Some of the papers in this issue indicate a growing proportion of broadband growth that is attributable to wireless.

Successful content applications are indicated in several papers as being fundamental to rapid growth for fixed and wireless broadband services. Whilst not specifically addressed in this Issue, anecdotal evidence suggests that another contributor to the extraordinary growth of wireless broadband in very recent years has been the success of cross-platform content delivery. This was emphasised in the Korea/Australia/New Zealand (KANZ) Broadband Summit held in Hobart in April 2011. This approach features increasingly in industry strategies that from a content perspective strive towards the broadband equivalent of any-to-any connectivity. It might be less fun viewing online graphics designed for a desktop on a small hand-held device, however it is increasingly possible.

GOVERNMENT POLICIES IN SUPPORT OF WIRELESS BROADBAND

Over recent years particularly, Governments of several developed economies have enthusiastically come to recognise and actively pursue the social and economic benefits of broadband, accordingly developing supportive policies and strategies. In some cases they have also committed to very substantial broadband infrastructure initiatives, including Australia's widely publicised NBN with its estimated AUD$36B cost, and even more recently New Zealand's Rural Broadband Initiative. Going back around twenty years ago, a few countries, notably including South Korea, began entrusting future social and economic development to their belief in the social and economic advantages and opportunities of broadband. Introducing pioneering broadband test-beds, they committed at an early stage to pursuit of such an evolutionary path via innovation and development.

With the advantage now of many years of broadband hindsight the Network Planning and Protection Division of the Korea Communications Commission (KCC) has provided a comprehensive paper in this Issue outlining broadband issues and policies that effectively throw light on Korean broadband success to date in that environment, whilst also highlighting current spectrum and technology constraints and limits generally recognised as being associated with large scale wireless broadband deployment.

National broadband policy is complex nationally but even more so regionally or internationally. In their paper 'European policies supporting wireless broadband' Plum Consulting (UK) helpfully summarise policy issues and other challenge for Europe, particularly across the EU. They address three main policy strands, namely broadband service provision in general, spectrum allocation and policies addressing competition issues in mobile markets. In relation to harmonised spectrum planning the paper highlights EC success and encouragement of flexibility, but with some national variations in use and growing network consolidation centralised regulatory interventions become more challenging. Meeting consumer needs increases need for centrally harmonised spectrum allocations but given opposition by some national regulators this seems some way off. The paper suggests that broadband targets at the EU level are not well founded and may be overly ambitious. It also highlights that despite EU harmonisation an area where national regulators can be expected to take different approaches remains in relation to competitive interventions.

SPECTRUM ISSUES

The issue of spectrum and wireless interference constraints identified in a number of papers is focused on in the Australian federal Department of Broadband Communications and the Digital Economy (DBCDE) paper, which includes a clear technical description of spectrum and interference mechanisms. It also offers an interesting indication of the potential in which anticipated spectrum demand pressure might be reduced from a 30 fold increase to a more manageable 2.5 fold increase through collaborative effort by technology vendors, network operators and the spectrum regulator respectively.

Based on a major shift in New Zealand broadband policy in 2010, the NZ Ministry of Economic Development describes in its paper 'Rural broadband technologies and the Rural Broadband Initiative' how the Government plans to 'close the digital divide between broadband services in urban and rural NZ' deploying a mix of fixed and wireless technologies via their Rural Broadband Initiative (RBI) and associated ultra-fast broadband initiative. Objectives include raising national productivity and NZ global competitiveness through broadband coverage to 97.8% of NZ households and 97.7% of schools.

NEW APPLICATIONS AND DEVELOPMENTS

In countries introducing national broadband networks, some critics still question the value and cost of broadband infrastructure investment. Meanwhile Samsung's paper 'Mobile Internet life in Smart Korea' provides remarkable insights into some of the innovative applications and developments that have helped make Korea the OECD's leading wireless broadband user, no doubt advantaged also by the infrastructure benefits of a relatively small geography and high population density. Whilst identifying technology and other challenges the paper effectively highlights the substantial impact of innovation and responsive markets together with proactive supportive Government policies in reaping many benefits from cost-effective broadband.

Representing the Australian mobile telecommunication industry, AMTA's paper 'Wireless broadband developments in Australia' provides further evidence of unprecedented levels of market demand for wireless broadband and highlights the need for Government policy and appropriate regulatory arrangements to foster continued innovation and infrastructure development, particularly in relation to spectrum and shared infrastructure arrangements. It highlights how national benefits from the digital economy depend on the right policy and investment mix for wireless broadband.

WIRELESS VERSUS FIXED ACCESS FOR HIGH-SPEED BROADBAND

Based on work first commissioned by NBN Co, the University of Melbourne's Institute for the Broadband-Enabled Society (IBES) paper on 'Where wireless broadband makes sense' investigates the potential use of wireless broadband to substitute for Fibre to the Premises in the rollout of the National Broadband Network, in both rural, remote and outer suburban areas. It helpfully highlights that deployment of wireless broadband instead of FTTP would require more spectrum than is available from the country's 'digital dividend', and many more base stations than exist for today's mobile networks.

AN OPERATOR'S PERSPECTIVE

Telstra's paper 'Wireless broadband – an operator perspective' provides a background on the evolution of wireless technologies and devices that will be familiar to a number of TJA readers, but also provides helpful commentary and insights into the high growth in demand for service and an already wide range of alternative access devices, and a particularly interesting overview of Telstra's recent introduction of fourth generation Long Term Evolution (LTE) technology with its increased functionality and speed capability.

TECHNOLOGY INNOVATION

It is always pleasing being able to report on original work, in this case designed to support the provision of broadband backhaul technology, particularly for providing high speed broadband services to rural and remote areas. As described in the paper 'Multi-gigabit wireless backhauls for broadband networks', with CSIRO's innovative backhaul technologies, this multi-band microwave backhaul can provide up to 10 Gbps data rates over several tens of kilometres range. Hopefully this well detailed paper will stimulate further research interest and industry development.

Further reporting original work, in this case aimed at achieving the ultimate goal of universal broadband access, is again a pleasure. In the CSIRO ICT Centre paper 'Ngara Broadband Access System for rural and regional areas', details are provided of their symmetric 12 Mb/s uplink and downlink for six simultaneous users using only 7 MHz of frequency bandwidth, together with a progress report on the development of a hardware demonstrator capable of symmetric 50 Mb/s uplink and downlink for twelve simultaneous users, using 28 MHz frequency bandwidth – which would achieve the spectral efficiency of 40 bits/s/Hz.

As LTE networks are being launched worldwide the availability of LTE devices has increased tenfold according to a recent Pyramid Research report. This suggests that while laptop and notebook computers account for the majority of current subscriptions, smartphones are expected to become the largest segment by 2014.

Looking to the future, a University of South Australia paper from their Institute for Telecom Research, '4G and beyond in Australia: technologies and opportunities in the NBN era' appropriately concludes this wireless broadband themed set. Reviewing 4G and looking further ahead, based on what it describes as Australian leadership and innovation in mobile broadband uptake, the paper proposes use of near-ubiquitous fibre infrastructure as a post-4G platform, to facilitate green, efficient and fast mobile-over-fibre and fixed/mobile convergence.

CONCLUSIONS

Most papers in this Issue collectively reinforce global evidence of strong growth in demand for a seemingly limitless array of wireless broadband information and entertainment services. They highlight the associated appearance of a growing range of access devices supporting government, business, health educational and social applications. Whilst timing did not allow inclusion of related papers on cross-platform content transparency, there is much other evidence to support this associated development, leading to what might effectively be labelled an any-to-any content access principle, which has the telephony equivalent as its precedent.

Another collective issue to emerge from these papers is that whilst wireless broadband will forseeably continue to complement fixed broadband access, at this stage the path to much more extensive wireless broadband remains constrained by spectrum, infrastructure and technology issues, including propagation, interference, speed and delay (latency). IBES has highlighted the extent of this issue and DBCDE has suggested some ways of addressing this.

A further key theme to emerge is the importance of key stakeholders working together proactively to help ensure a mutually beneficial, responsive innovative and cost-effective fixed and wireless broadband future.

There are other technology and market developments not covered in this Issue. It is by no accident that Google recently purchased a mobile phone company (Motorola Mobility). When invited to write, Google Australia acknowledged the importance of such developments and hoped to be in a position to comment further in the not distant future. Similarly an Innovative Australian broadband content company was not currently in a position to write on its innovative cross-platform content developments. Bell Labs are amongst a number of technology organisations around the world working on wireless broadband technology advances and implementations to further improve performance and speed constraints.

If the histories of world telecommunications, global economics and markets are any guide, then in the not-too-distant future the extraordinary continuing demand for wireless broadband will, one way or another, lead to technology, policy, spectrum management and regulatory outcomes, applications and devices that increasingly make it possible. Together with infrastructure sharing and pricing reforms this is likely to accelerate fixed/mobile convergence and help satisfy dramatically increasing demand for wireless broadband products and services over the years to come, as the world lurches towards a new world economy.

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