On this view, interests beyond the broadcasting industry may be concerned that the uncertainty produced by the High Court's decision will exert an unfortunate stifling effect on the televised public domain, as various forms of comment and criticism which make use of other broadcasters' content may disappear from our TV screens.[9]

The Panel case currently awaits reconsideration by the Full Federal Court, which will determine the application of the substantial part test and the availability of the fair dealing defence in light of the High Court's findings. Given that the substantial part test is underdeveloped in the context of Part IV of the Act, there remains the distinct possibility that there will be another series of appeals before the matter is ultimately resolved.

Brendan Plant is a Law Graduate in the Sydney office of Allens Arthur Robinson, and Niranjan Arasaratnam is a partner in the firm's Hong Kong office.

1 Network Ten Pty Limited v TCN Channel Nine Pty Limited [2004] HCA 14.

2 TCN Channel Nine Pty Ltd v Network Ten Pty Ltd (2002) 118 FCR 417.

3 TCN Channel Nine Pty Ltd v Network Ten Pty Ltd (2001) 108 FCR 235.

4 See eg Nine Network Australia Pty Ltd v Australian Broadcasting Corporation (1999) 48 IPR 333 at 340, Time Warner Entertainment Co Ltd v Channel 4 Television Corporation PLC (1993) 28 IPR 459 at 468 and Ashdown v Telegraph Group Ltd [2001] EWCA Civ 1142 at par 61.

5 Above, n 1 at [75].

6 Ibid.

7 Above, n 1 at [155].

8 See, for example, Michael Handler, 'The Panel Case and Television Broadcast Copyright' (2003) 25 SydLR 390.

9 See Melissa de Zwart, 'Seriously entertaining: The Panel and the future of fair dealing' (2003) 8 Media & Arts LR 1.

Knowledge Cycles of Digital Television in Australia

In this edited version of her paper presented at the Communications Research Forum 2003, Cate Dowd looks at the development of Australian digital television and some future directions.

Information about Australia's digital television infrastructure and a limited knowledge of reception systems may have impacted on the knowledge base for early-development decisions. The *timely reach* of information for knowledge formation remains important to the progress of digital television. The shortfalls of implementation suggest a need for a model that represents digital television as an evolving enterprise of diverse agents and complex transactions.

The base for a theoretical model might include 'knowledge cycles and communicative transactions'[1] as a means of understanding digital television as a form of major technological change. It might include ideas, motivation and agents for change as an extension of conventional information analysis and design. An 'eco-techno' system model[2] would represent *technological* change as an ecology beyond static architectures, entities and agents. Such a model might assist understanding and direct policy in a time of review, which otherwise appears likely to be marked by a *commodity* approach.

The sale of Australia's national transmission network in the early stages of developments led to a broken contract for transmission services, due to claims of unprofitable investments by the international company involved. The operational plans for Australia's transmission infrastructure also remain entangled in access issues for detailed information.

Understanding the early *communicative* transactions for change is as important as the identification of financial transactions. Important questions have been raised by the approaches so far. First, how can transmission infrastructure be reinstated as a public asset? Secondly, will the Australian Government succumb to international corporate interests with the anticipated sale of spectrum for broadcasting?

The technical knowledge of digital television involves many entities that stand against legislative requirements for broadcasters, including a quota for HDTV content that occupies the whole bandwidth of a digital channel. The potential of a channel is actually more sophisticated than this reduction, suggesting that policy needs to be informed by deeper knowledge of the technologies, beyond market models produced by a *productivity* agent of a government. The motivation behind change, via text agents, could also be reviewed and include reflections on the phenomena of technological convergence.

The agents of change for digital television include major technical standards that have been designed as open and evolutionary standards. Australian broadcasters, content developers, consumers and manufacturers are all influenced by the cycles of knowledge in the development process. The Multimedia Home Platform standard for the set-top box (commonly referred to as the MHP) will ultimately involve transactions with other agents for functionality, such as metadata standards. These entities need to be represented in a model of transactions with other distribution systems, such as mobile phones as a set of digital systems.

THE EMERGENCE OF DIGITAL TELEVISION IN AUSTRALIA

The digital transmission systems and standards for reception devices developed by the DBV[3] based in Geneva are major areas of development for Australian digital television. These entities involve complex and dynamic transactions across organisations and

agents that are still being understood by those who embrace theory and practice and 'read everything and know all the institutions and practices'.[4]

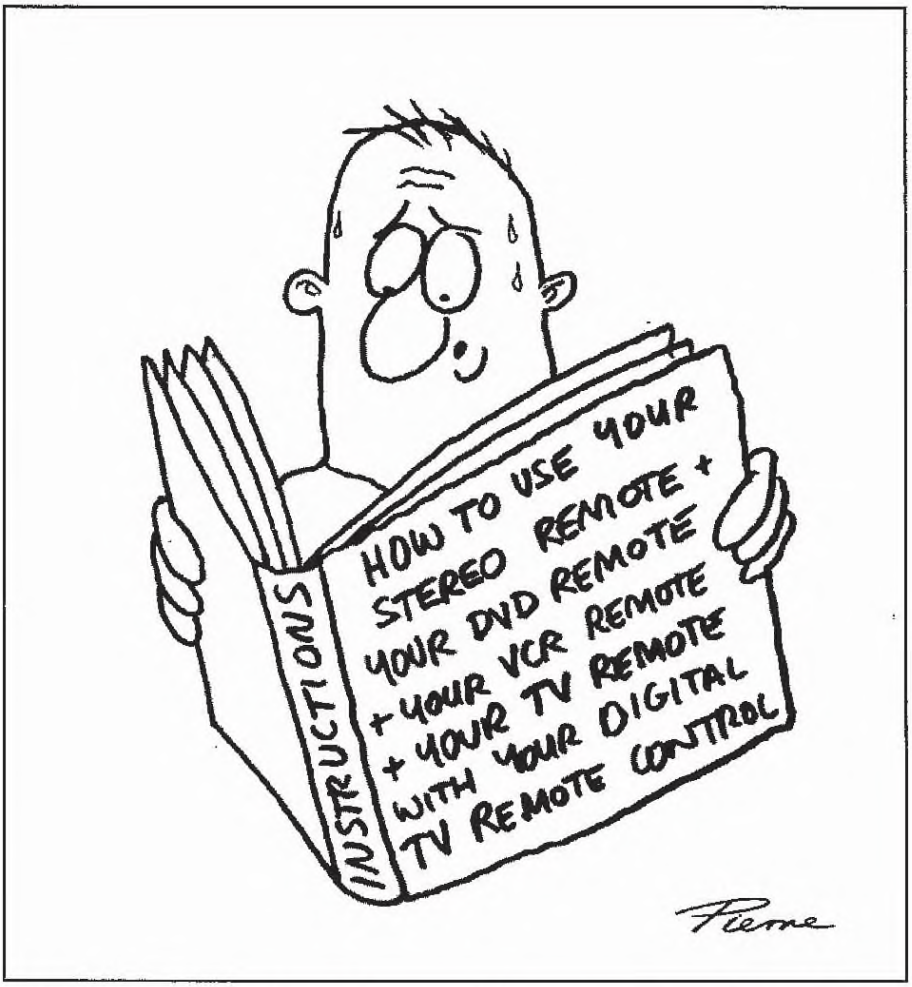
Digital transmission infrastructure developments in Australia began with negotiations for new facilities that involved the ABC, the Australian Government and an international ICT company, Ntl. The *Television Broadcasting Services (Digital Conversion) Act 1998* (Cth) marked the major turning point that synchronised with the pre-sale of national transmission services in 1999. The changes evolved behind a screen of commercial-in-confidence,[5] which meant that 'interaction-knowledge cycles'[6] about the Commonwealth transmission towers were barely noticed, indeed were contained. However, the transactions for implementation of services did produce limited services in major metropolitan regions by 2002, but these were highly disproportionate to the costs. Plans for regional Australia are another stage of developments for 2004.[7]

By July 1999 the Australian Broadcasting Authority (ABA) had published technical plans for approaches to digital terrestrial television broadcasting, which included digital channel plans (DCP) for the nation. From mid 2000 until January 2001 transmitters and digital signals for the ABC were tested in a period of consolidation.

Ntl, the international company that entered into a contract for 15 years with the Australian Government and the ABC was pleased with a long-term contract to deliver digital broadcasting transmission services:

'Ntl's services to the ABC covering a whole network of analogue TV and radio and digital television transmission services, is probably the largest out-sourced transmission contract in the world.' (Ntl, 2000)[8]

The provision of transmission services via an international company has presented ongoing risks for 'national-public' broadcasters as they have a high dependency on large networks, which



are increasingly owned by private operators whose primary interests are in making profits.

By mid 2001 an Australian newspaper reported that "transmission specialist Ntl, is bedevilled with old technology... and crippling debts of almost $40 billion".[9] By the end of 2001 Ntl announced a series of 'cost cutting initiatives'.[10] In February 2002 Ntl announced that it would sell its Australian Broadcast Business for $850 million dollars to Macquarie Bank and focus on its core business in Europe.[11]

Although the closed transactions for transmission services were limited to a few agents of change due to commercial-in-confidence in negotiations the flaws were soon exposed. However Australian citizens have been denied knowledge (and services) about public assets valued somewhere between $650 million (see Government Assets Sales Register)[12] and $850 million dollars. Had information about transmission infrastructure been factored into a model as a communicative transaction, not just a financial one, the *reach* of knowledge may have been higher.

Digital technologies have already enabled multi-channels and a range of creative concepts in the broadcasting domain and spectrum is emerging with a potential commercial value. For some years the Australian Government has speculated on the returns from the sale of spectrum, adopting a *commodity* approach that is apparent in Productivity Commission documents.[13] Spectrum management plans as noted via the Productivity Commission could only ever be achieved once digital infrastructure systems, ie transmission facilities, were in place.

THE COST OF SPECTRUM

Australia's broadcasting infrastructure problems combined with payments to the Government for particular usage of digital technology for multiple streams or Datacasting as outlined by the productivity commission[14] suggests

problems. The strategic approach for digital broadcasting leads to a plan for spectrum. The return of one digital channel from each broadcaster by 2008, to the government, once the simulcast period is over, appears to be designed so that the extra channels can be available as commodities to new players, without acknowledgement that in such a competitive market there will be finite advertising dollars.

The plans for spectrum do not appear to offer any guarantees for public broadcasting, or even genuine alternative services beyond 2006, only more competition and more content. Without critics of the 'authoritative information that has formed from knowledge and positions',[15] especially for spectrum management, and with a lack of diverse viewpoints, the 'reach of ideas'[16] is stifled and cannot promote innovation!

The potential use of spectrum as a choice between alternative services or wide screen images via a single channel is bound in legislation that partly defines how some broadcasters use their allocated 7MHz of spectrum. However, a quota for HDTV content for all free-to air broadcasters involves high costs for production and consumption and is difficult to achieve, indeed 'Australia has mandated a unique, high cost system',[17] which continues to thwart the progress of digital television.

The risky cycle of developments involves fragmented knowledge about markets and investments for creative content for *more* or *less* interactive services, with more or less bandwidth. There is also a gap in knowledge about related 'social values' during this major technological change that should involve cultural institutions and individuals in understanding change for 'citizens' of the future, beyond being users or consumers.

DIGITAL CONTENT PRODUCTION AND MULTI-CHANNELS

Broadcasters at the start of the 21st century remain focused on the core developments of digital broadcasting for fixed media in residential settings whilst mobile devices are mostly used, in a broadcasting context, only for interactive feedback. However, mobile devices of the future are likely to be different and might involve television. At present one-way interactivity, enabled with a set-top box, such as user choice for different camera angles on sports programs is best achieved using a wide-screen television set.

The HDTV format uses an aspect ratio of 16:9 compared to a standard television aspect ratio of 4:3, the latter commonly associated with 'the box'. The core of content for television over the years has been filmed in the standard format and until substantially new content is shot in 16:9 the old standard dominates the broadcasting screen. The variations in visual screen dimensions in the digital television environment were first noted by Hillery in a review of the first set-top box for Australia in 2002.[18] Broadcasters still only produce and purchase a limited amount of content in wide-screen in 2003.

A contemporary set-top box can enable one-way interactivity and multi-channel services that for a short time were offered by the ABC according to legislation[19]. Between 2002 and 2003 the ABC developed two multi-channels consisting of separate streams on a limited basis for a children's television channel called ABCKids™, and a youth stream called Fly™ TV[20]. The services were also retransmissions via Pay TV, including OPTUS channel 37 and AUSTAR Channel 14, however the ABC cut these services in June 2003 due to funding problems.

Multi-channels provide a means for specialised content for targeted audiences, but also have a potential to fragment markets. The sheer volume of content required for multi-channels can also be a burden that impacts on the potential explorations for progressive content. Knowledge of new digital television directions can be partly understood by understanding the basic system architecture and functionality of a reception device.

SYSTEMS AND STANDARDS FOR DIGITAL RECEPTION & INTERACTION

Between 2001 and 2003 several DVB Multimedia Home Platform[21] compliant set-top boxes were manufactured for the Australian market. However each box had different levels of functionality.[22] The open MHP standards for free to-air broadcasting are a contrast to the closed systems used for Pay TV and include evolutionary stages of development for technological convergence with the protocols of the World Wide Web and other standards.

The MHP system architecture and systems, which are akin to an operating system, use three core application areas based on profiles, for either 'enhanced broadcasting, interactive broadcasting, or internet access'.[23] Each profile consists of two levels accommodating for evolutionary stages of development, some of which are clearly dependent on other solutions, such as telecommunications entities.

Digital interactive content has so far been developed for numerous broadcasts, including the BBC documentary 'Walking with Beasts', which contained features such as resizable video windows and alternative narrative streams. These levels of functionality are possible due to the communication channels and other protocols[24] of an MHP system and the networks that the system connects with,[25] particularly for interactivity, and Internet connectivity.

The broadcast channel protocols enable the download and retrieval of programs via transmission streams in a specified way and apply across all three profiles of an MHP system. It is mandatory[26] for all digital receiver products, whether basic or advanced, to use these protocols if they are to conform to the MHP standard. Such uniformity is critical for broadcast content to be retrieved.

The MHP system is hardware independent and involves 'user agents'[27] that enable systems to function across a variety of platforms. It is not inconceivable that the commonality between 'digital' systems, including

mobile devices as 'pervasive' technologies, might feed into the advances of the MHP or a related standard, producing new levels of connectivity with mobile devices.[28]

CONCLUSION

New ideas for digital broadcasting developments, some suggested in this paper, could be included in a future model for improved understanding. The sale of transmission services in Australia, and forthcoming spectrum still require solutions that might be better understood by knowledge of the' *distance* between communication partners'[29] especially as these entities involve major transactions.

Digital television is barely *visible* to the average consumer or citizen, yet the consumer continues to pay for infrastructure and is reduced to a citizen with limited *access* to knowledge about developments.

The Australian public must have knowledge of the technologies and transactions of change in order to remain vigilant about Australian broadcasting as a cultural and financial asset. The focus must be on present problems and the plans for the sale of spectrum. Models need to be developed and critiqued by a range of industry experts who do not reach 'quick-fix' conclusions for policy. The closed transactions of Australia's transmission infrastructure suggest the need for a new approach to 'knowledge management' for Australia's *public* broadcasting future.

Cate Dowd is an academic at the University of Melbourne in the Department of Information Systems.
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3 The Digital Video Broadcasting Authority (DVB) sets broadcasting standards that can be recognised by the acronyms of the committees dealing with particular standards and are known within the broadcasting industry as DVB-C (cable), DVB-S (satellite) and DVB-T (terrestrial). "The DVB (Digital Video Broadcasting Project) is an industry-led consortium of over 300 broadcasters, manufacturers, network operators, software developers, regulatory bodies and others in over 35 countries committed to designing global standards for the delivery of digital television and data services" (http://www.dvb.org/latesthtml, 2002).

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5 Commercial-in-Confidence has been described as " a confidentiality provision, which enables companies to put details of research and development, tenders or other deals off limits to both public and parliament It doesn't have to be approved, but once it's applied, any flow of information abruptly ceases and appeals can result in long, drawn-out legal battles": Pelly J. (1999). *Commercial in Confidence and the rise of Secret Government*, retrieved from the web http://www.aidwatch.org.au/news/18/l2.htm. This quote was published by Aid Watch, but was not available via the web at the time of writing this paper.

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14 Payment for spectrum is evident in the Productivity Commission's Enquiry into Broadcasting Report with reference to spectrum on 'loan' to broadcasters. See p.199 ofhttp://www.pc.gov.au/inquirv/broadcst/finalreport/chapter06.pdf.

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20 See: http://abc.netau/t1vtv/.

21 The draft MHPI.O was published in July 2000 by ETSIIO (European Telecommunications Standards Institute). Works in progress related to MHP can be located via http://pda.etsi.org/pda/queryform.asp.

22 The DGTEC model from early 2002 included operability for HDTV, surround sound, multiple views, closed captions and other features. See http://www.dg-tec.com.au/homepage.html for specifications. Some services included multi-camera angles notably developed by channel 10 Sports. The first Set-top box released in Australia in 2001 did not enable reception of high definition signals (see Hillery, above n 18, 37-40).

23 DVB Digital Video Broadcasting, (2002), Digital Video Broadcasting (DVB) Multimedia Home Platform (MHP) Specification 1.2.1, retrieved from the web 2002 http://pda.etsi.org/pda/Quervform.asp, 55.

24 The MPEG 2 Transport stream is the common standard for all profiles of an MHP system, whether it is for enhanced, interactive or Internet profiles. See the broadcast Channel Protocol stack on page 56 and the platform profile definitions on p.362 of the MHP 1.1 draft document or corresponding pages of the later MHP version 2 via http://pda.etsi.org/pdalquervform.asp.

25 DVB Digital Video Broadcasting, above n 23, 55.

26 Ibid 364.

27 A user agent is a helper application involving an 'actor' that communicates the 'runtime' of applications with an Application Program Interface. See page 73 of the DVB-MHP 1.1 document, above n 23.

28 Dowd C, 2003, above n 2.

29 Kaufer, D.S., & Carley, KM, above n 1, 100.