



2010-01-01

Beyond Europe: Launching Digital Radio in Canada and Australia

Brian O'Neill

Dublin Institute of Technology, brian.oneill@dit.ie

Follow this and additional works at: <http://arrow.dit.ie/aaschmedbk>

 Part of the [Broadcast and Video Studies Commons](#), [Communication Technology and New Media Commons](#), and the [Film and Media Studies Commons](#)

Recommended Citation

B. O'Neill, Beyond Europe: launching digital radio in Canada and Australia . In O'Neill, B., M. Ala-Fossi, et al., Eds. (2010). Digital Radio in Europe: Technologies, Industries and Cultures. Bristol, Intellect Books, pp.135.152.

This Book Chapter is brought to you for free and open access by the School of Media at ARROW@DIT. It has been accepted for inclusion in Books/Book chapters by an authorized administrator of ARROW@DIT. For more information, please contact yvonne.desmond@dit.ie, arrow.admin@dit.ie, brian.widdis@dit.ie.



This work is licensed under a [Creative Commons Attribution-NonCommercial-Share Alike 3.0 License](#)



[1] Chapter Seven

Beyond Europe: launching digital radio in Canada and Australia

Brian O'Neill

Eureka 147 was, as we have argued throughout this volume, a European technology designed within the very particular context of European public service broadcasting (see also Rudin 2006; O'Neill 2009). At the same time, the consortium behind DAB technology had the ambition that Eureka 147 would become the world standard for digital radio. DAB was indeed the first such technological system to achieve standardisation at the European Telecommunications Standards Institute (ETSI), and be recommended as a global standard for digital terrestrial sound broadcasting by the International Telecommunications Union (ITU). Its early and highly successful demonstration at the convention of the National Association of Broadcasters (NAB) in the United States as early as 1991 was a further indicator of the strength of the system and the legitimacy of its claim to be a world leader (Hakanen 1991). However, the fact that it was a European-originated technology, ill-equipped to meet the different needs of the US radio industry, in addition to the potential disruptive effect it might have on a fiercely competitive market, meant that by 1992 DAB was off the agenda in the United States and never a serious contender for adoption (Ala-Fossi and Stavitsky 2003). Despite this, Eureka 147 has had success in many other countries across the globe and there are currently regular DAB services in Australia, China, Canada, Singapore and South Korea, with trial services in a host of other countries,

including India, Indonesia, South Africa, Vietnam, Taiwan and so on (WorldDMB 2009). This chapter examines two examples of DAB adoption beyond Europe: Canada, which had an early and close relationship with the development of the DAB standard, and Australia, which was the first country to formally adopt the DAB+ standard and in 2009 embarked on the largest such country-wide launch of the newer digital radio platform. Both examples offer comparable illustrations of national initiatives in supporting the roll-out of new digital radio technologies – one very recent, and one from the mid-1990s – and offer some important lessons for equivalent European experiences.

[2] Eureka 147 in Canadaⁱ

Canada might be described as a pioneer of the first generation of digital radio broadcasting, and was among the first wave of countries who in the mid-1990s supported a policy of seeking a migration of all radio broadcasting onto a digital platform (Chouinard et al. 1994) – Canada formally adopted the Eureka 147 standard as the replacement technology for AM and FM analogue broadcasting in 1995 (Canadian Radio-television and Telecommunications Commission 1995; O'Neill 2007). This policy remained in place until 2006 when the regulator, the Canadian Radio-Television and Telecommunications Commission (CRTC), issued a revised digital radio policy, pursuing a more flexible, multi-platform approach to digital transition, reflecting the greater uncertainty surrounding future options for radio in the digital era (Canadian Radio-television and Telecommunications Commission 2006; O'Neill 2008).

More than just an enthusiastic early adopter of digital radio and Eureka 147, Canada was in fact closely involved in its development, and the government-funded Communications Research Centre played a central role in EBU technical committees, leading the development of the Digital Audio Broadcasting system (Communications Research Centre 1997; Lavers 2003). As early as 1989, an ad-hoc advisory group convened by the private radio sector organization, the Canadian Association of Broadcasters (CAB), began to advocate the idea of a national strategy to implement the transition of the national broadcasting system from analogue to digital. The group with industry-wide representation – the public Canadian Broadcasting Corporation (CBC), private broadcasters represented by CAB, and representatives of the government Department of Communications – considered the various options available, and organized demonstrations of DAB in 1990 (Chouinard et al. 1994: 58). Following the success of these trials and the enthusiasm expressed across the radio sector for the project, a government Task Force was established to advise on the relevant technical, policy and regulatory aspects of introducing digital radio to Canada. It issued its report in 1994, outlining detailed plans for the relevant coverage and service issues, as well as making recommendations on the policy and regulatory implications (Task Force on Digital Radio 1995). An implementation body, Digital Radio Research Inc. (DRRI), (later Digital Radio Roll Out Inc.), was formed from the original consortium and became the official body mandated to promote digital radio in Canada. Industry Canada, the government department responsible for spectrum management, formally adopted Eureka as the standard for digital broadcasting in Canada, and allocated 40MHz of spectrum in the L-band range (1452-1492 MHz) for new broadcast services (Lavers 1993).

Canada's adoption of Eureka 147 was to some extent a radical and controversial choice given the different circumstances pertaining there (Chouinard et al. 1994: 60). In contrast to the European situation where public broadcasters were the key proponents of the new system, the Canadian Broadcasting Corporation was a part of but by no means the leading advocate for digitalizing radio (O'Neill 2006). Broad support from the private radio sector and co-ordination by its representative organization was a key feature of the Canadian approach. The decision to develop an entirely new band for digital radio using L-Band spectrum was also in contrast to the Band III VHF spectrum preferred in Europe. Canada's VHF spare capacity was very limited however. L-band, on the other hand, offered a new platform from which to launch digital radio and which, in the Canadian view, would be the least disruptive for the existing radio market (Task Force on Digital Radio 1995: 18). Accordingly, Canada lobbied strongly for L-Band development, and in 1992 won WARC approval for L-Band as the only radio spectrum allocated exclusively for digital radio transmission on a worldwide basis. Internationally, actual implementation of digital radio on L-Band continued to be the less preferred option given its lower propagation characteristics and added costs.

An integral feature of the Canadian plan was its proposed integrated mix of terrestrial and satellite delivery for which L-Band was deemed the best option approach (Communications Research Centre 1997). This, however, placed it in conflict with the United States where the military had reserved it for systems testing, blocking its use for other purposes. Subsequently, the United States reached an agreement with Canada that the latter would restrict L-Band DAB to terrestrial broadcast in order to avoid interference (Barboutis 1997). But the Canadian satellite plan was now

compromised and placed DAB transmission on a more expensive and challenging terrestrial-only footing. The United States' opposition to the use of L-Band for radio broadcasting stemmed from the threat that it posed to the established market for AM and FM radio (Ala-Fossi and Stavitsky 2003). Unlike in Canada where it was proposed to move all existing AM and FM stations onto the L-Band, the crowded and highly competitive US market ruled out any such migration. Developing a new band for digital radio would create unacceptable competition. Accordingly, United States' radio interests developed the alternative 'in-band, on-channel' approach as a technical solution to enable digital radio transmission within existing bandwidth and without recourse to L-Band or satellite transmission (Rathbun 2000). By contrast, the Canadian approach was designed to complement existing radio interests: each AM and FM broadcaster would have an equal opportunity to compete in the new digital environment. It was hoped that the phased transition to L-Band outlined in the regulator's 1995 digital radio policy (Canadian Radio-television and Telecommunications Commission 1995) would create an optimal digital radio system, sufficient to allow the shut down of analogue services in due course.

A further feature of the Canadian policy was the requirement that digital radio offer demonstrably superior quality, including audio quality of 256kbs (thereby limiting each multiplex to a maximum of five programme services), as well as ensuring there would be no interference with existing AM/FM services. In the agreed licensing framework, all existing AM and FM licensees were allocated frequencies in the 1452-1492 MHz L-Band, and an allotment plan was developed in each of the major metropolitan areas to allow the digital service to match as closely as possible the coverage of existing stations. This involved defining DAB coverage around the

largest FM station within any given market and grouping up to five existing FM stations into a single multiplex. Replacement of wide area AM stations was restricted to the largest equivalent, though smaller, FM coverage area. As a replacement technology, stations were licensed only to simulcast existing services and were not permitted to offer new or additional services. Equally, no new licences were to be offered for the duration of the transition nor would any new operators be enabled to enter the market until a full migration of existing services had occurred.

The pioneers of digital radio in Canada could claim considerable optimism for its prospects during the initial inception phase. The groundwork and development for DAB in Canada was described as a textbook case of co-operation among the many interests involved (Chouinard et al. 1994: 79). The relatively small group at DRRI who pioneered and championed the cause of DAB ensured that the technology had been perfected and standardized, the necessary spectrum had been obtained and a solid foundation was in place for large scale implementation (Edwards 2001). With sufficient marketing, public information and availability of receivers at a reasonable cost, it was widely believed that consumers would be clamoring for DAB (Bray 2000).

An official launch of digital radio in Canada took place in 1999 at the convention of the Canadian Association of Broadcasters, and a steady roll out of stations with DAB services proceeded in key metropolitan areas. Within a short period, there were 57 stations broadcasting in DAB, reaching 35 per cent of the population, some 10 million listeners in Toronto, Montreal, Windsor and Vancouver, with a further launch of DAB services in Ottawa to follow (Bray 2000). By 2002, the CAB's vice president of

radio could confidently claim Canada's emergence as a world leader in digital radio (Cavanagh 2002: 30). A major boost to the marketing of DAB was the announcement by General Motors of Canada of its plans to install DAB receivers as standard equipment in its vehicles for the 2003 model year. Also in that year, DRRI commissioned an engineering study to extend the national coverage of DAB in a series of corridors between the major metropolitan centres. Significant progress also appeared to be underway in receiver availability: Radio Shack Canada announced it would carry a range of home and portable DAB consumer products across its stores. The development of a new DAB chip by Texas Instruments also promised greatly reduced prices for receivers, and the first DAB/FM personal portable below the psychologically all-important \$100 became available.

[2] What went wrong for DAB in Canada?

Despite these positive early indications, DAB in Canada, as elsewhere, did not live up to expectations or develop as the mass consumer technology as expected (Lavers 2003). By 2006, there were officially 73 licensed DAB stations in Canada or 62 that were fully operational, primarily in the main cities of Toronto, Vancouver, Montreal and Ottawa. Coverage was estimated to reach eleven million potential listeners. However, listenership for all stations was low and was not even monitored by official audience measurement. DAB receivers were never readily available either for home or car use largely due to the lack L-Band receivers. Industry professionals soon became disillusioned and regarded the investment in time and resources since 1995 as unproductive and wasteful. By the time digital radio policy came to be reviewed in 2006, the objective of migrating all radio to DAB was regarded as misguided. The reasons for the failed deployment are familiar from other markets around the world

and call into question many of the founding assumptions guiding the first phase of digital radio.

In the first place, it is clear that there was a very poor consumer response to the development of DAB in Canada, and at no time within the period 1995 to 2005 could it be said that digital radio firmly took hold. There was poor awareness of the service and, indeed, even of the existence of the new technology or its potential benefits for radio listening. There were particular difficulties with the supply of receiver equipment and it was erroneously assumed that a range of equipment would follow with the adoption of DAB in Europe. Despite DRRI's efforts to create awareness of DAB and its benefits, the fact that receivers were largely unavailable or difficult to source proved extremely damaging to the prospects of an early take up of DAB. Initial costs of around \$2000 for high-end consumer receivers gave DAB an elite image that proved difficult subsequently to shake off. Lower cost receivers, once they were available, performed poorly, adding further difficulties to any potential increase in supply of receiver equipment.

With poor availability of receivers, and in many instances poor quality of what was available, the much-heralded enhanced features of the digital radio listening experience proved to be unattainable or far below expectations. The assumption that the promise of enhanced CD-like audio quality would be the unique selling feature of the new technology proved unfounded in Canada as elsewhere. It was also the case that many of the promised additional services did not arrive either, with most stations simply offering simulcasts of their analogue services. Despite initial enthusiasm for the possibilities of data services, with few exceptions none really materialized.

The failure to gain the support of the automotive sector was also a blow to DAB in Canada. DRRI's success in getting a commitment from General Motors Canada for installation of DAB receivers in its 2003 models proved short lived when difficulties emerged over supply of equipment, and segmenting production for those areas of the Canadian market where DAB was available (Lavers 2003). In the absence of a timetable for the roll-out on a national level of DAB, General Motors withdrew their support for a standard fit out of DAB and like the rest of the sector began to adopt 'a wait and see' approach. General Motor's subsequent shareholding interest in XM satellite radio in the United States, in due course a competitor against DAB and conventional radio in the Canadian market, further impeded any long-term interest in the platform.

Despite the initial enthusiasm and strong support by private broadcasters for the DAB project in the early 1990s, its failure to take off either internationally or in the Canadian market led to a gradual cooling of enthusiasm if not outright withdrawal of support. Doubts began to emerge over the decision to adopt Eureka 147 once it became clear that a different approach was to be pursued by the United States. Canada's decision to adopt DAB was made in the knowledge that this would not be followed in the United States, and the subsequent development of IBOC or HD-Radio placed Canada and the United States at odds, with radically different approaches to digital radio broadcasting (Federal Communications Commission 2007). It was assumed that as radio was primarily a local medium, use of incompatible systems either side of the border would not prove too significant. Experience has shown, however, that it is difficult for Canada to pursue a different course to its near

neighbour and, unquestionably, the adoption of IBOC in the United States contributed to the growing unease among industry members in Canada about the wisdom of their DAB policy (see Stacey 2007). In spite of the fact that Eureka 147 DAB was acknowledged to be the technically superior system (Bouchard 2007), many industry executives came to accept that successful implementation of IBOC in the United States would eventually lead to its adoption in Canada. Further objections to DAB began to be raised following estimates of the investment required to extend its coverage, and the proposal to establish transmission corridors between major metropolitan centres proved to be a prohibitively expensive proposition.

This cooling of support from the industry for DAB was reflected in the relatively low profile adopted by CBC, the national public broadcaster (O'Neill 2006). In contrast to the European situation, where public broadcasters played a leading role in the development and the roll out of the technology, CBC has been a participant rather than a leader in DAB (Patrick et al. 1996; Galipeau 2003). A member of the original Task Force for the Introduction of Digital Radio and a fifty per cent partner in DRRI, CBC was an active and equal participant in industry efforts to steer the sector towards the digital domain. However, CBC was not a champion of DAB and did not develop any dedicated digital-only services or lend DAB any particular promotional support. DAB was effectively co-opted as one of a number of options in an overall new media strategy which included the Internet, subscription digital audio services via cable and, more recently, satellite broadcasting – for which it did develop new services (O'Neill, 2006). In truth, the downsizing of CBC's engineering division (Lavers 2006) reduced its capacity for anything other than programme-driven priorities, and while CBC now experiments with newer applications such Digital Multimedia Broadcasting or DMB

using DAB technology, its interest in digital terrestrial radio *per se* has waned considerably.

One further effort to launch DAB in Canada was attempted in 2006 when the Canadian company CHUM Ltd. proposed a subscription radio service across Canada on a digital terrestrial DAB network to compete with the imminent launch of satellite radio. Satellite radio had made a high profile entry into the Canadian market in 2005 when both XM and Sirius platforms were licensed to operate their subscription service under revised Canadian broadcasting regulations (O'Neill 2007; O'Neill and Murphy in press).

CHUM proposed the establishment of a national terrestrial DAB network providing 50 channels initially, subsequently growing to 100 channels, for a monthly subscription fee of \$9.95. Controversially, whereas the bulk of the satellite's music service of over 100 channels was not subject to the normal Canadian content regulations, CHUM's proposal as a terrestrial service was licensed under the normal content rules for all Canadian broadcast services. CHUM signed a technology agreement with equipment manufacture RadioScape for specially designed receivers that could also be used to pick up regular, non-subscription DAB channels, thereby re-launching DAB in Canada. The proposal included using existing DAB allocations for AM and FM replacement, as well as reduced bit-rates of 128 kilobits per second to achieve the density required for a 50 channel service. Adoption of DAB+ in the future was also suggested, with consideration to be given to 'more advanced codecs providing an approximate doubling of spectral efficiency' (Pizzi 2004).

CHUM's proposal never got beyond the planning stage, and while its application was approved, the fact that its satellite rivals could offer greater choice without Canadian content restrictions completely undermined its business case. While the intention may have been to restart debate about Canada's digital radio policy in offering a pro-Canadian solution to new competition, the response of the regulator was to effectively let the market decide. The fact that no special protection was afforded to CHUM's 'Canadian' proposal effectively spelt the end of the strategy of migrating the industry onto the Eureka 147 platform.

Summing up what had been an unproductive ten-year period since the initial introduction of DAB into Canada, one radio executive candidly remarked:

I believe it was a waste of time and money and we are still sitting here with nothing. I never understood (it). I said from day one there's no indication that consumers want replacement technology. They don't see our signal being as bad as we think they think it is. And I don't think we ever researched it correctly. In terms of our plan which was always to put our existing stations on a new platform and transition – waste of time, money and no demand. (G. Slaight, personal communication, August 12, 2005)

[2] Towards a new digital radio policy

The Canadian regulator, the CRTC, recognizing the stalled state of digital migration, issued revised digital radio policy in December 2006 (Canadian Radio-television and Telecommunications Commission 2006). The notice acknowledged those factors which had acted as blockages to the roll out of digital transmission, such as poor

availability of receivers, the use of L-Band, the development of IBOC and the growing interest in satellite radio and other digital distribution platforms. The lack of additional digital content was also agreed to be a major constraining factor in that consumers were essentially being encouraged to buy new receivers to receive the same content. Of particular relevance to Canada was the fact that digital radio was only available in the major markets. The proposal to roll out digital transmission in the main traffic corridors between major cities had proved prohibitively expensive, and as a consequence the automobile industry had switched its support to satellite subscription radio (CRTC, 2006: 6).

The revised policy, developed in consultation with the sector, was intended to provide a new regulatory environment for digital radio broadcasting and new options for the radio industry. The industry had confirmed in its submissions to the Commission that the original 1995 policy had failed. The CBC argued that the transitional policy should be abandoned, and that ‘the future of DRB in Canada will not be that of a replacement technology, but as a technology that will co-exist with the existing analogue radio services’ (CBC/Radio-Canada 2006). The CAB, representing private radio, argued that it was ‘simply not realistic to assume that a successful digital transition will be no more than the replacement of the existing business with minor additions and adjustments. Nor does digital transition necessarily mean the destruction of the old business and the creation of a new one’ (Canadian Association of Broadcasters 2006). A transition to digital in the Canadian context would only be successful on the basis of commercially viable propositions that included new content, affordable receivers, promotion and competitive technical features. Eureka 147 would continue to be part of the equation but so would its variants, such as

multimedia broadcasting, options for IBOC, Internet distribution and technologies for distribution to hand-held mobile devices.

Therefore, the most important provision of the revised digital radio policy was for a digital ‘new service model’, overturning the replacement strategy based on simulcasting AM and FM services on L-Band (CRTC 2006: 38). Licensees under the revised policy were now free to develop whatever broadcast services they saw fit, subject to the same regulatory provision as existing FM services, though with greater flexibility promised for specialty services. Radio station owners continue to have privileged access – each guaranteed a digital licence for every analogue licence held – with the aim of facilitating licence holders to build additional services in L-Band while maintaining their FM and AM holdings. The new service model explicitly recognized the co-existence of analogue and digital broadcasting into the future, acknowledging that FM would continue to show robust growth, with only the long-term future of AM being in any doubt.

From a technical point of view, the limit on five stations sharing a 1.5 MHz L-Band channel or multiplex remains in place though the policy suggested that DAB+ could be adopted in the future (it was at the time undergoing standardization). In addition, however, IBOC technologies, subject to satisfactory testing for any potential interference to other stations, would be permitted for licensing. Technologies which re-used existing analogue spectrum such as IBOC or DRM had advantages and would also be considered for licensing. Finally, the revised policy supported testing multimedia broadcasting options (such as DVB-H and DMB technologies) to deliver

a mix of audio, video and related data services in the L-Band subject to sufficient spectrum being made available.

In advance of the policy, Canadian broadcasters had called for a flexible, multi-option plan that would enable them to compete with the new digital audio services now widely available to consumers. They sought a flexible approach to digital radio conversion that would support supplementary services rather than replace analogue broadcasting (Stacey 2007). The revised digital policy provided broadcasters with everything they required and gave licensees every freedom 'to propose the technology or technologies they believe will be the most appealing to the listening public' (Arpin 2007). Somewhat ominously, the Commission added that no guarantee of success could be offered given that many of the factors that had led to the current stalled-state of Canadian digital radio, including poor availability of receivers, remained in place.

The industry response to the new policy was communicated at a round table convened by the CRTC in 2007. At this event, industry representatives gave a very cautious assessment of IBOC's potential for Canada, having found a number of technical deficiencies compared to analogue FM coverage (Bouchard 2006; Lehane 2007). Likewise, there was little enthusiasm for a repeat of the simulcasting on digital that had previously been so unsuccessful. Instead, the consensus view was that multimedia broadcasting offered the greatest potential for a 'new service model' for Canada and the single best opportunity for digital radio implementation. Demonstrations of DMB integrating radio, mobile video and data-casting, and converging on devices such as cellular telephones were proposed by the industry as the optimal digital radio solution. The proposal included an ambitious plan for 70 Single Frequency Network (SFN)

sites across Canada, aiming to reach approximately 60 per cent of the population in three years at a total capital cost of CDN \$106 million, using DMB in the L-Band to support multimedia broadcasting to handheld devices. A consortium approach was proposed as the best framework to build out the necessary infrastructure, whilst content partnerships between companies, as well as with telecommunications, were envisaged as the way forward.

Given that the proposal involved a substantial change of use for L-Band spectrum initially granted for digital radio transition, the spectrum regulator Industry Canada intervened (Industry Canada, 2007), and suspended any further development of services pending the outcome of a consultation on the future use of L-Band.

Suggesting that broadcasters might not be the only parties interested in the spectrum and that alternative means of allocating it including auction might be considered, Industry Canada added that the consultation would determine the most appropriate allocation for the band and the means of making the spectrum available for potential users. At the time of writing, no further progress has been made on the future use of L-Band and it would appear that once more Canada's digital radio policy has stalled.

[2] Digital radio in Australia

There are many points of comparison between Australia and Canada in terms of digital radio implementation. There are obvious geographical similarities in that both countries occupy a large continental land mass requiring extensive and powerful transmission systems to ensure universal coverage. The centres of population in both are concentrated in the major metropolitan areas. Radio markets in Canada and Australia are also comparable: as in Canada, Australia's economically vibrant media

system has a strong tradition of public broadcasting, but privately-owned broadcasting has the dominant share of listening and viewing. Ownership of the media in both countries is also highly concentrated and, following changes to ownership rules in both, there has been considerable consolidation of the industry over the past five years. Currently 80 per cent of radio stations in Australia are in the hands of twelve radio networks (Nielsen Media Research 2009). There are currently about 261 commercial radio stations on air in Australia and commercial radio accounts for 70 per cent of listening. There are approximately 37 million radio sets across the country, every household has at least one radio and on average have 5.1 sets, 99 per cent of all cars having a radio and almost 8 in 10 Australian's listen to commercial radio every week (Commercial Radio Australia 2009). The public broadcaster, the Australian Broadcasting Corporation (ABC), runs national and local public radio and TV stations as well as Australia Network, a TV service for the Asia-Pacific region. The other main public broadcaster is the Special Broadcasting Service (SBS), whose radio and TV networks broadcast in many languages. There is also a strong community radio sector with 230 stations across the country and a further 1500 low power FM and temporary community stations.

Digital radio was first considered in Australia in the late 1990s. A policy for the introduction of digital television in 1998 also included a plan for digital radio which never proceeded to implementation (Given 2003: 149). A report to the government in 1997 had recommended Eureka 147 operating in the L-Band, taking Canada's lead, while also exploring the possibility of VHF spectrum in Australia's crowded metropolitan areas, as well as the potential of satellite technology for national coverage. The implementation model proposed also followed the Canadian approach

in recommending automatic access for all national and commercial broadcasters in a transitional or developmental phase during which they would simulcast on analogue and digital platforms in order to develop the new technology and experiment with new services. Incumbents would get priority access and a moratorium on any new commercial competition for a period of years. New entrants would in due course get access to frequencies to further develop the market for digital radio services, and at some point in the future, analogue switch-off would follow.

While interest in digital radio was strong and considerable planning was put into how best to develop it in Australia, issues over availability of spectrum and capacity for all the radio interests involved served to delay any move to implementation. Channel 9A – the TV-band VHF frequency between 202MHz and 209MHz – was granted by the regulator first for trials of digital radio broadcasting and subsequently for licensing digital radio services. While in most metropolitan areas there was sufficient capacity within this band for three multiplexes, a hybrid solution using both Band III and L-Band would be required to enable sufficient capacity for all interested licence holders. This added greatly to the cost of transmission and would place additional burdens on radio stations converting to digital, and as a result digital radio fell off the agenda for a period as broadcasters weighed up the costs involved (Given 2008). At the same time, new audio services were being developed without the need for a digital broadcasting network, such as ABC's new DiG or digital radio service available through digital TV and via the web. Further expansion of commercial, community and low power FM services raised the question as to whether additional digital choice was needed.

The fact that DAB in Australia did not launch as originally planned did have the benefit of enabling the industry to re-evaluate its approach to digital radio. With the rapid adoption of digital television, broadband Internet and digital audio devices, the resolve of the sector to develop its presence within the digital environment was as strong as ever, and Commercial Radio Australia (CRA), the representative organisation of private radio in Australia, continued to lobby strongly for its introduction. Legislation in 2006 prepared the ground for a new launch to digital radio, this time earmarked for 2009, taking into account varying international experiences such as the United Kingdom and Canada, new technology developments, in particular better compression technologies, and a consolidated industry view of what was required to make digital radio a success.

The government's policy framework included a number of important developments (Coonan 2005a). For one, digital radio was defined as a *supplementary* rather than a *replacement* technology. Based on the ten years of experience of digital radio deployments elsewhere, it was acknowledged as highly unlikely that all analogue radio services could be converted to digital or indeed that digital radio might ever be a complete replacement for analogue broadcasting. It was observed that no country that had introduced any of the digital radio platforms had done so with a realistic expectation of analogue shutdown (Coonan 2005b). Given that Australia did not have the problem of legacy technologies as for example in the United Kingdom, with a large installed base of DAB receivers, a new digital radio launch in Australia could now benefit from the very latest new technology developments – specifically DAB+ using the improved and more efficient AAC coding – thereby increasing capacity and quality of services.

The framework for digital radio implementation now proposed included a moratorium of six years during which incumbent commercial broadcasters would have priority access to digital spectrum, subject to conditions attached to roll-out and coverage requirements for digital transmission. In contrast to the UK where one company, Digital One, controlled the commercial multiplex, Australia's framework gives commercial stations and larger community stations the right to jointly own and manage the multiplex infrastructure and hold the associated spectrum licences. In addition, access rules are established to ensure that multiplexes are operated in a transparent and non-discriminatory way. Finally broadcasters would not be constrained by being required to simulcast their existing services, and would be free to develop whatever new services or enhancements they felt appropriate to encourage the take up of digital radio.

[2] Australia's 2009 digital radio launch

The launch of digital radio in Australia in 2009 represents a critical test of new approaches to digital radio broadcasting. It is the first formal launch of the new DAB+ platform, with its added features and superior quality, and its success may determine future deployments in countries such as China and India. Drawing on the many experiences of previous efforts to launch digital radio in the marketplace, Australia has had the advantage of learning the lessons from numerous previous examples of what is required to incentivize the industry and to attract consumer interest. To date, the approach adopted by Commercial Radio Australia, co-ordinating on behalf of the sector, has been held up as a textbook case of co-operation between industry interests – private and public – and the government, and offers the best opportunity yet for a systematic roll-out of a new, digital terrestrial radio broadcasting

platform. The fact that it represents the first test case for the DAB+ platform is also highly significant for the future of the Eureka family of technologies.

According to CRA, one of the key lessons to be learned from the UK experience is the importance of offering not just new content but also a new experience for radio listening (in Given 2009). For this, the added capacity and multimedia capabilities of DAB+ are central. The UK experience of providing new content and added choice, Australian broadcasters point out, has been a partial success, but yet in ten years has only achieved ten per cent of overall radio listening. A further lesson is that in launching the new digital radio service, digital radio needs to offer as comprehensive a range of radio listening as possible, offering a ‘one stop shop’ for all current AM, FM and new digital services. Sensing that the attachment to a familiar and much-loved medium must be preserved at all costs, a carefully crafted marketing plan based around an enhanced radio listening experience has been undertaken. The tag line for the CRA’s \$AUS10 million digital radio promotional campaign – ‘its radio you know and love, plus more’ – seeks to convince listeners that the new technology will host all current favourite services, with added features and enhancements. Among the new features being promoted are those of superior quality, ‘crystal clear’ sounds that will provide an immediate sonic upgrade for the 48 per cent of Australian radio stations operate in the AM band; electronic programme guides and other visualization add-ons such as scrolling text, animated logos and product photos; as well as the pause and rewind features that are available in more sophisticated sets.

The switch-on date for the new digital services was initially planned for May 1st 2009, with the aim of having the first five markets in the mainland capital cities of Sydney,

Melbourne, Adelaide, Brisbane and Perth launch simultaneously. The government has required that digital radio services must be on air in the state capital cities (excluding Hobart) by July 1 2009, and all existing national, commercial and wide-area community broadcasters in each city be able to broadcast digitally. It is unlikely that digital radio will be extended to regional areas until more broadcast spectrum becomes available following the turn-off of the analogue television network in 2013 (ABC 2009). The formal launch was later delayed to August 2009, in part due to delays and funding difficulties at the public broadcaster ABC in installation of its transmission equipment. Instead, May 1st was used as a date for test signals being switched on, to be followed subsequently by a saturation advertising campaign. A key priority for the project, regarded as key to its success, has been to maintain its unified approach and reinforce the fact that all broadcasters are launching on the new platform with existing and new services. The other essential ingredient has been to ensure sufficient supply of receivers for what is a new digital format, likewise seeking to avoid mistakes of earlier initiatives which were severely undermined by poor retail support and consumer awareness.

Despite the fact that the Australian launch has been one of the most extensive and best planned launch campaigns to date for digital radio, a number of issues persist which pose further challenges to its long-term sustainability. A problem familiar from the example of Canada is the fact that the launch is restricted to the major metropolitan areas, initially the five capital cities of Sydney, Melbourne, Brisbane, Adelaide and Perth. Once outside of the coverage area, listeners need to retune to AM and FM. While an option for satellite transmission has been considered and the spectrum reserved for future development, the costs are likely to be as prohibitive as elsewhere

(Broadcast Australia 2005). Likewise, it has been conceded that DAB is not suited to full national coverage and that an alternative digital platform such as *Digital Radio Mondiale* will be needed in the future (Coonan 2005b). Therefore, for the moment, digital radio will be restricted to major radio markets in cities, but crucially will lack the universal coverage that existing analogue services have. Within cities, concerns have been expressed about the quality of the spectrum that has been allocated for digital radio use, and that problems in field signal strength have already posed difficulties in ensuring quality of reception in buildings (Braue 2008). This is not an ideal situation, as the CRA readily admit, when trying to convince the public of the superiority and quality of the service on digital.

Secondly, while spectrum planning and the organization of Australian multiplexes has ensured that all public and commercial broadcasters are represented on the new platform, there is insufficient capacity to mirror the full range of services that currently exist on analogue. In particular, the large community radio sector has struggled to gain sufficient spectrum, even for some of its city-wide services, and has expressed its unhappiness with the provision for community radio (Given 2009: 4). All other stations have been allocated a minimum of 128kbs, enough for at least two FM quality services plus data services. Stations are free to use their bandwidth as they see fit and are not, as in many previous launch schemes, required to simulcast their existing services. Given the higher audio quality of DAB+ at lower bit rates, talk radio, for instance, will have extensive capacity to offer new channels, whereas for music, the trade-off between quality and additional content will continue to be a factor.

A further question for Australian digital radio is whether the broadcast platform can be sufficiently appealing to consumers against a host of other competing digital audio services, including MP3 players, mobile communication services and the Internet. Is its digital radio offering, in other words, too late to be able to successfully compete in the digital audio market place where rival services have had a lead time of ten years to develop and mature? Commentators point out that many of the features that digital radio promise, even in its new DAB+ version, are currently available through existing products, analogue and digital, and that the wide availability of high quality FM reception, RDS tuning and a host of personal media players mean that there may be little incentive for consumers to invest in a service that may be of only marginal benefit. Industry interests concede that digital radio may be a long-term project, relying on a strategy of embedding services with younger audiences on the understanding that a sustainable level of adoption may take many more years (Given 2009). Despite this, the Australian radio industry has pressed ahead with strong support from Australia's leading commercial radio operators and the public broadcaster, confident that the new technology of DAB+ and the potential for success of its new brands and services provides the right way forward for the development of the medium.

[2] Conclusion

Lessons learned from across Europe and beyond have contributed to a growing understanding of the ingredients required for a successful launch of digital radio in the twenty-first century. To be effective, industry experts argue that digital radio needs to offer: a) a strong consumer proposition to include attractive new content, probably involving multimedia, a good range of appealing receivers and guaranteed good

reception; b) it requires an integrated approach from broadcasters – who understand the benefits of lower transmission costs and new channel capacity; and finally, c) it needs an encouraging framework from governments and regulators (Howard 2008). Many of these elements were absent from the first generation of digital radio roll out, of which the Canadian experience was a classic example, and consequently digital radio there has a low priority among broadcasters and has lost momentum within Canadian media development strategy. By contrast, Australia has reaped the advantage of learning from others' experiences and, despite having hesitated, is in a better position to move forward with a newer technology and a more realistic assessment of the role of digitalization in the development of the medium.

Australia's role as a pioneer of the new generation of terrestrial digital radio broadcasting is important for other countries around the world considering new deployments of digital radio, and an important test case for Europe in particular. With the major radio markets of Germany and Italy proposing new launches of DAB+ from 2010 on, in addition to the launch of digital services on T-DMB in France, Australia's much admired example of industry coordination and strategic thinking will be followed closely. It is clear from the examples of both Canada and Australia that replacement of the analogue transmission network is no longer the primary motivating factor of digital radio deployment, and that a full migration, if it is to occur at all, is a very long-term objective. It is also recognized that the uptake of digital radio is an inherently slow process and that it will be many years before the success of current strategy or investment is known.

Both Canada and Australia also illustrate new thinking about the ‘additionality’ involved in a digital radio strategy. Canada’s new service model or the supplementary nature of many of the new Australian services illustrate again the age-old maxim of content being king, and suggest that for digital radio to succeed it will need exciting new content not available on other media. Whether such content can be produced economically, without a proven business model for digital radio as a distribution platform, remains to be tested. Canada’s approach suggests that digital radio will be a niche service, possibly paid for by subscription, whereas in Australia the emphasis has been on free-to-air radio, augmenting existing services with new content and new functionality. The underlying rationale articulated by Australia’s radio industry, reiterating earlier arguments for the development of the technology, was that it was inconceivable that radio would be the only mainstream broadcasting platform to remain analogue-only (Coonan 2005a). Whether the investment in DAB+ proves to be the correct choice will be the subject of much debate in years to come.

References

- ABC (2009), ‘What is digital radio?’, <http://www.abc.net.au/radio/digital/>. Accessed 1 June 2009.
- Ala-Fossi, M. and A. G. Stavitsky (2003), 'Understanding IBOC: Digital Technology for Analog Economics', *Journal of Radio Studies*, 10:1, pp. 63-80.
- Arpin, M. (2007), ‘Speech to the Annual General Meeting & Conference of the North American Broadcasters Association’, *Annual General Meeting & Conference of the North American Broadcasters Association*, Mexico City, Mexico, 6 March 2007.
- Barboutis, C. (1997), 'Digital audio broadcasting: the tangled webs of technological', *Media Culture & Society*, 19: 4, pp. 687-90.
- Bouchard, G. (2006), 'First Canadian Encounter with the New Radio Transmission Technology', *CBC Technology Review*, 2, pp.1-12.

Bouchard, G. (2007), 'HD Radio™ Technology Trial in Canada', *CBC Technology Review*, 4, pp.1-11.

Braue, D. (2008), 'Internet killed the (digital) radio star', *cnet Australia*, <http://www.cnet.com.au/internet-killed-the-digital-radio-star-339289967.htm>. Accessed 1 June 2009.

Bray, D. (2000), 'A little DAB will do ya', *Broadcaster*, June 2000.

Bray, D. (2000), 'Digital Radio: A Numbers Game', *Broadcaster*, September 2000.

Broadcast Australia (2005), 'Submission By Broadcast Australia In Response To The "Introduction Of Digital Radio Issues Paper" ', December 2004, www.archive.dbcde.gov.au/data/assets/pdf_file/0020/26075/Broadcast_Australia_public_submission.pdf. Accessed 1 June 2009.

Canadian Association of Broadcasters (2006), 'A Submission to the Canadian Radio-Television and Telecommunications Commission with respect to Broadcasting Public Notice CRTC 2006-72'.

Canadian Radio-television and Telecommunications Commission (1995), 'Public Notice CRTC 1995-184: A Policy To Govern The Introduction Of Digital Radio', Ottawa, Canada.

Canadian Radio-television and Telecommunications Commission (2006), 'Broadcasting Public Notice CRTC 2006-160. Digital radio policy', Ottawa, Canada.

Cavanagh, R. (2002), 'The future is sound with DAB', *Broadcaster*, January 2002, p.30.

CBC/Radio-Canada (2006), 'CBC Submission, Review of the Commercial Radio Policy – Broadcasting Notice of Public Hearing CRTC 2006-1', http://www.cbc.radio-canada.ca/submissions/crtc/2006/BPN_CRTC_2006-1_CBCSRC_150306_e.pdf. Accessed 1 June 2009.

Chouinard, G., F. Conway, W.A. Stacey and J.R. Trenholm (1994), 'Digital radio broadcasting in Canada - A strategic approach to DRB implementation', *EBU Technical Review*, Winter.

Commercial Radio Australia (2009), 'Radio Facts', http://www.commercialradio.com.au/index.cfm?page_id=1007. Accessed 1 June 2009.

Communications Research Centre (1997), 'Digital Radio Broadcasting and CRC', <http://www.crc.ca>. Accessed 1 June 2009.

Coonan, H. (2005a), 'Framework for the introduction of digital radio', Media release, http://www.minister.dcit.gov.au/coonan/media/media_releases/framework_for_the_introduction_of_digital_radio. Accessed 1 June 2009.

- Coonan, H. (2005b), 'Speech to Commercial Radio Australia Conference', http://www.minister.dcita.gov.au/media/speeches/digital_radio_-_commercial_radio_australia_conference. Accessed 28 May 2009.
- Edwards, S. (2001), 'Spoiled For Choice Issues and Options For Digital Radio', Speech to *Radio, Television and the New Media*, Canberra, Australia, Australian Broadcasting Authority, 3-4 May 2001.
- Federal Communications Commission (2007), 'Digital Audio Broadcasting Systems And Their Impact on the Terrestrial Radio Broadcast Service', <http://www.fcc.gov/mb/policy/dab.html>. Accessed 1 June 2009.
- Galipeau, C. (2003), 'New Media at CBC', Presentation at *Publishing Across New Media Platforms*, Simon Fraser University, Vancouver.
- Given, J. (2003), *Turning off the television: broadcasting's uncertain future*, Sydney, Australia: UNSW Press.
- Given, J. (2008), 'Broadcasting. Has radio blown the future?', *Creative Economy Online*, <http://www.creative.org.au/>. Accessed 1 June 2009.
- Given, J. (2009), 'Content to the Different', *The Herald Sun*, 5 March, p.4.
- Hakanen, E. A. (1991), 'Digital audio broadcasting - promises and policy issues in the USA', *Telecommunications Policy*, 15:6, pp. 491-496.
- Howard, Q. (2008), 'The Attributes of Digital Radio', Presentation at *EBU Digital Radio Conference 08*, Cagliari, Sardinia, 18-19 September.
- Lavers, D. (1993), 'Canadians shift L-band DAB into gear', *Broadcasting*, 123:4, pp.116-18.
- Lavers, D. (2003), 'Communications Research Centre', *Broadcast Dialogue*, November 2003.
- Lavers, D. (2003), 'What now for DAB in Canada?' *Broadcast Dialogue*, June 2003.
- Lavers, D. (2006), 'CBC Technology - A Phoenix Rising', *Broadcast Dialogue*, March 2006.
- Lehane, S. (2007), 'Digital radio: state of the industry - crtc opens doors to multiple digital radio standards', *Broadcast Dialogue*, April 2007.
- Nielsen Media Research (2009), 'All homes in Australia have at least one radio', <http://www.nielsenmedia.com.au/industry.asp?industryID=13>.
- O'Neill, B. (2006), 'CBC.ca: Broadcast Sovereignty in a Digital Environment', *Convergence*, 12:2, pp.179-197.
- O'Neill, B. (2007), 'Digital Audio Broadcasting in Canada: Technology and Policy in the Transition to Digital Radio', *Canadian Journal of Communication*, 32:1, pp. 71-90.

- O'Neill, B. (2008), 'Digital Radio Policy in Canada: From Analog Replacement to Multimedia Convergence', *Journal of Radio & Audio Media*, 15:1, pp. 26 - 40.
- O'Neill, B. (2009), 'DAB Eureka-147: a European vision for digital radio', *New Media Society*, 11: 1-2, pp. 261-278.
- O'Neill, B. and M. Murphy (in press), 'Crossing Borders: The introduction and legislation for satellite radio in Canada', in L. Parks and J. Schwoch (eds.), *Down to Earth: Satellite Technologies, Industries and Cultures*, Piscataway, NJ: Rutgers University Press.
- Patrick, A. S., A. Black and T. Whalen (1996), 'CBC Radio on the Internet: An Experiment in Convergence', *Canadian Journal of Communication*, 21:1.
- Pizzi, S. (2004), 'Rethinking DAB North of the Border', *Radio World Online*, <http://www.rwonline.com/article/4102>. Accessed 1 June 2009.
- Rathbun, E. A. (2000), 'Proceeding with digital radio', *Broadcasting & Cable*, 130: 17, p. 35.
- Rudin, R. (2006), 'The Development of DAB Digital Radio in the UK: The Battle for Control of a New Technology in an Old Medium', *Convergence*, 12:2, pp. 163-178.
- Stacey, W. (2007), 'Canada Eyes IBOC Additions to DAB', *Radio World Online*, <http://www.rwonline.com/pages/s.0049/t.775.html>. Accessed 1 June 2009.
- Task Force on Digital Radio (1995), *The sound of the future: The Canadian vision*, Ottawa: Minister of Supply & Service.
- WorldDMB (2009), 'Country Information for DAB, DAB+ and DMB', http://www.worlddab.org/country_information. Accessed 1 June 2009.

Notes

ⁱ This section draws on research previously published in the *Canadian Journal of Communication* (O'Neill 2007) and the *Journal of Radio and Audio Media* (O'Neill 2008). Original research for this chapter was supported by a grant from the Ireland Canada University Foundation.