

2006-04-01

Digital technologies and the future of radio: lessons from the Canadian experience

Brian O'Neill

Technological University Dublin, brian.oneill@tudublin.ie

Follow this and additional works at: <https://arrow.tudublin.ie/aaschmedcon>



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

Recommended Citation

O'Neill, B. 'Digital technologies and the future of radio: lessons from the Canadian experience', COST Action A20 Plenary Conference "The Impact of the Internet on the Mass Media in Europe" Delphi, Greece, 26-28 April 2006.

This Conference Paper is brought to you for free and open access by the School of Media at ARROW@TU Dublin. It has been accepted for inclusion in Conference Papers by an authorized administrator of ARROW@TU Dublin. For more information, please contact arrow.admin@tudublin.ie, aisling.coyne@tudublin.ie, vera.kilshaw@tudublin.ie.

COST A20

“The Impact of the Internet on the Mass Media in Europe”

Delphi, Greece, 26-28 April 2006

Title: **Digital technologies and the future of radio: lessons from the Canadian experience**

Author Name: **Brian O’Neill**

Affiliation: **School of Media, Dublin Institute of Technology**

Short Bio: Brian O’Neill is Head of the School of the Media at Dublin Institute of Technology. His research interests include social impact of new technologies, auditory cultures, and Information Society issues. He is a member of the European research group DRACE - Digital Radio Cultures in Europe Group (COST A20)

Full address: **School of Media, DIT Aungier Street, Dublin 2, IRELAND**

Email: brian.oneill@dit.ie

Telephone: **353-1-4923115**

Abstract

This paper reports on an ongoing comparative study of the development of digital radio in Europe and Canada. Focussing on the Eureka 147 Digital Audio Broadcasting (DAB) platform in Canada, of which it was an early adopter, the paper examines the complex interaction of industry, government regulation and the difficulty of policy formation matching the pace of technology development. Based on interviews with leading radio professionals, the paper presents a critical review of the ‘transitional policy’ towards the digitalisation of radio and examines the international market pressures that led Canada to largely abandon this approach in favour of the current multi-platform system. Despite extensive regulatory intervention to protect Canadian interests, the dominant influence of the US market on Canadian broadcasting matters is evident. Most recently, the entry of satellite-delivered subscription radio services by XM Radio and Sirius have illustrated the difficulty of regulating against powerful, global interests. Often seen as combining the best aspects of the European public service system with the commercial success of the US industry, the current stage of policy development in Canadian digital radio offers, it is argued, some important lessons for similar developments in Europe.

Digital technologies and the future of radio: lessons from the Canadian experience

Introduction

Radio broadcasting is poised to undergo significant transformation over the coming years as a number of new digital broadcasting technologies offer enhanced audio quality and reception, integrated data and multimedia content, and more efficient use of the radio spectrum. Digital Audio Broadcasting or DAB is the most established of these technologies. Developed in Europe as the Eureka-147 standard in the mid-1980s, DAB was also adopted by Canada and widely tested in the early 1990s. While the progression to digital forms of delivery is an agreed objective of the radio industry, there is less consensus on whether DAB offers the best means of achieving this or whether there are more appropriate or expedient solutions. Patterns of development internationally are now quite variable: some countries such as Canada continue to promote DAB, but others, such as Ireland, are delaying implementation or even withdrawing earlier deployments. Some ten years after its inception, the progress of DAB internationally has been patchy and broadcasters and regulators are now evaluating a number of other approaches to the realisation of a fully digital radio landscape.

The current paper, building on a comparative approach to the study of the roll out of digital radio developed within the Digital Radio Cultures in Europe research group (DRACE), reports on the situation in Canada. The paper traces the background to the deployment of digital radio in Canada and examines the prospects for a successful implementation of Digital Audio Broadcasting. It reports also on alternative technology platforms impacting on digital radio in Canada and examines some of the key environmental factors for digital radio, including the regulatory regime, availability and deployment of technology platforms, economic and market considerations, as well as audience interest and adoption. Based on fieldwork conducted in Canada in 2005 during which key radio professionals and industry analysts were interviewed, this paper offers a report on the situation up to the end of 2005 when the first new subscription-based digital satellite services were launched.¹ It is argued that Canada offers a particularly useful example for comparative purposes

due in part to its tradition of public service broadcasting based on European models, as well as the leading role given to the regulator in developing policies designed to support Canada's role as a world player in digital technologies.

The introduction of digital radio, regardless of the system or platform adopted, offers many opportunities and significant challenges for broadcasters and policy makers alike. While the technical advantages of digital radio broadcasting have been amply demonstrated, the business case is largely unproven and the future viability of any one approach uncertain. A comparative approach, therefore, is a useful means of analyzing the issues involved and potentially offers insights into the factors that will most impact on the emerging digital landscape. Comparing the respective issues and prospects for digital radio broadcasting in Canada and Europe provides an ideal opportunity to examine questions of policy formation and implementation in quite contrasting radio environments though with some underlying common features. Canada and Europe share strong public service traditions in broadcasting through a variety different economic models. In the case of Canada and Ireland, both support vibrant private, commercial radio sectors with high levels of listenership. They have as near neighbours major broadcast markets which impact strongly on the domestic context and in part constrain the opportunity for development.

Competing platforms for digital radio

Radio, the oldest of electronically broadcast mass media, stands at a particularly interesting point in its development in the early twenty first century. Digital means of broadcasting offer new opportunities for value-added content, enhanced quality and more efficient use of the radio spectrum (Hakanen, 1991). The European-developed Eureka-147 standard known as Digital Audio Broadcasting (DAB) is the most established of the new digital audio technologies in radio but increasing use of the internet and satellite forms of distribution have also contributed to a significant re-assessment of radio's future (see Kozamernik, 2004). Indeed, the anticipated widespread adoption of wireless broadband applications and the use of radio-like technologies to distribute multimedia content, including audio and radio on demand, have led some to question the future of radio at all and ask whether it will in due

course metamorphose into a new form of information and entertainment delivery (DTI, 2004).

The international context for the adoption and implementation of new digital radio technologies is a complex one (see Barboutis, 1997; Hendy, 2000; Lax, 2003; Dick et al, 2003). DAB, with the support of the European Broadcasting Union (EBU) was widely adopted in most European countries throughout the 1990s, and has also been deployed in Canada, Australia and in parts of South East Asia. While not the only form of digital radio transmission, it has been described as the most revolutionary and complete system, and the first big technological change in radio since the appearance of FM, stereophony and transistors (Martínez-Costa, 2005). DAB's progress has been slow, however, in part due to sluggish governmental and regulatory support, the initial unavailability of affordable receivers, and the general lack of enthusiasm on the part of service providers to take advantage of DAB's potential for value-added content. The UK is the leading exception to this where there has been wider market acceptance of the standard and strong incentives for content providers to develop DAB-only services. However, the decision of YLE, the Finnish public broadcaster, to shut down its DAB network in 2005 has sent a warning signal to the broadcast world that DAB long-term may not be the only digital solution.²

Satellite digital radio, or SDARS has made its greatest impact in the United States where two companies, XM Satellite Radio and Sirius, have been licensed to provide SDARS services on a pay-subscription basis. Serving a potential audience of 270 million, SDARS offers a commercial-free, digital alternative to existing radio services and is primarily aimed at in-car listening which accounts for some 50% of radio listenership in the United States. Also in the United States, the reluctance of the FCC (Federal Communications Commission) in the US to disrupt the established and highly successful FM radio market led to its decision to adopt the IBOC (In Band On Channel) system (Ala-Fossi, 2003). This is an approach which integrates analogue and digital signals within the same transmission, thereby using existing spectrum but without the addition of new services. Now branded as HD Radio, or high definition radio, the IBOC system is something of a hybrid making the transition to digital easier but limiting what it can offer. Another digital radio standard aimed at the re-utilisation of the AM band (short, medium and long wave) is Digital Radio Mondiale (DRM). It

promises near FM-quality with the capacity to integrate data and text on existing AM frequencies. Offering improved reception and functionality over analogue AM, DRM is a technically successful, non-proprietary system universal system but which one awaits regulatory, market and broadcaster support.

While not directly a competing broadcast technology, the impact of the internet on radio has also been significant and use of the internet as a means of providing added information and on-demand services has been central to most broadcasters' digital strategy (Evans, 2001). The global reach of the internet and its widespread adoption in everyday life have opened new possibilities for distribution of radio content as well as the creation of new internet-only, online radio services. In addition, the internet's interactive features allows greater personalisation of radio content and the use of communicative channels such as email and discussion forums for enhanced listener involvement. Internet-enhanced features may point towards some of the characteristics of radio's future but are not in themselves considered by broadcasters a replacement of the one-way, point-to-multipoint wireless transmission that defines radio. However, emerging technologies utilising digital transmission to provide mobile multimedia services and broadband access such as DMB (Digital Multimedia Broadcasting) may provide another platform for radio in the future (Kozamernik, 2004).

Development of Digital Audio Broadcasting (DAB) in Canada

Canada, as Chouinard notes (1994: 59), has more often been a follower than a leader in the development of new broadcast technologies. Yet in the case of digital radio, Canada adopted the role of enthusiastic 'early adopter' and within the North American context led the field in digital radio broadcasting during the 1990s. As early as 1989, an ad-hoc advisory group under the auspices of 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 comprising public in the Canadian Broadcasting Corporation (CBC), and private broadcasters represented by CAB, as well representatives of the Department of Communications, led discussion of the various options available and organized demonstrations of the Eureka 147/DAB system in 1990 (Chouinard et al, 1994: 58;

Roman, 2006). Following the success of these trials and the enthusiasm expressed across the radio sector for the project, a governmental Task Force for the Introduction of Digital Radio in Canada was established in 1992 to advise on all relevant technical, policy and regulatory matters. 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.³ Digital Radio Research Inc. (DRRI), (later Digital Radio Roll Out Inc) was established from the original consortium of private broadcasters and the CBC, for the purpose of financing and managing facilities for digital radio research and assuming responsibility as the official body mandated to promote and organize public demonstrations of digital radio in Canada. Following the lead of the International Telecommunications Union (ITU-R) who in 1994 recommended the Eureka-147 system as the global technical standard for terrestrial and satellite radio broadcasting, Industry Canada formally adopted the standard for digital broadcasting in Canada and allocated 40MHz of spectrum for the purpose in the L-band range (1452-1492 MHz).

From the start, digital radio broadcasting and the Eureka 147 standard was intended to be a replacement technology and therefore much of the planning for its implementation was based around compatibility with existing services. Radio was seen to be in a period of transition at the end of which analogue systems of transmission and reception would be completely replaced by digital technology. In order to facilitate the transition, existing radio licence holders would be given priority access to the digital radio band. The development of a new band for radio broadcasting was also viewed as a good way of enabling expansion in the sector. There was little capacity left for FM development and AM with its inferior sound quality could in one transition be upgraded to a much superior system.⁴ The policy governing the introduction of digital radio was published by the government regulator, the CRTC in 1995 and outlined a two-staged approach whereby the Commission would first license digital radio undertakings on this transitional basis.⁵ Later, a public process would be initiated to consider all aspects of digital radio broadcasting in the longer term. The policy adopted involved granting licences to all incumbent operators who wished to use digital facilities to provide a simulcast of their existing services, licences which would remain in effect until a long-term digital radio policy was developed. Licence holders would have some opportunity during the

transitional period to develop separate programming for their digital services, limited to 14 hours per week. Applications for new licences or for additional services would only be considered on a case by case basis and subject to Commission's policy of supporting the existing radio market.

Canada's support of Eureka 147 in the L-Band was not without controversy (Chouinard, 1994: 60). Its support of a wideband transmission technology was justified on the basis of ensuring high quality audio and maximum spectrum efficiency. The choice of wideband using L-Band spectrum was in contrast to the approach adopted elsewhere and was justified on the basis that it would offer superior quality, that it wouldn't interfere with existing AM/FM services and that it offered the best potential for value-added data services. All existing AM and FM licensees were allocated frequencies for each 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 5 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.

From the industry point of view, broadcasters expressed a commitment to the future of radio as digital and argued that the best course of action to develop its potential was an industry-wide co-ordinated effort to oversee its development. Among the arguments offered was the fact that listeners' increasing use of CDs and other digital audio devices led to audience expectations of higher quality that only a digital system could provide. Studios and many parts of the production process were undergoing a process of digitalization and it appeared logical that this would in due course be extended to the transmission system. Technically, a digital system, it was argued, could provide a more robust and reliable service to the portable and mobile listener and in particular provide a much-improved service to the automobile listener. A further incentive for broadcasters was the potential to become players in the

development and roll-out of digital services and considerable emphasis was given to the potential new revenue streams that might become available with DAB's data carrying abilities.

DRRI's recommendations on programming practices for digital radio outlined features it was hoped would drive the development DAB and make it a highly attractive consumer product.⁶ These included a consistent approach to displaying station name and format and as the technology developed the opportunity to display logos and other graphical information; dynamic labels to display information about whatever is currently playing on air. Using available data capacity, stations could also offer programming enhancements, interviews, breaking news, weather forecasts, different languages, etc. For example, if a consumer is listening to a song on air, they could push that station's sub-channel button to hear an interview with the artist. Finally, a listener access to a 'tell me more' button which would provide additional information about a programming feature or an advertiser, eventually leading to interactive e-commerce applications.

Parnis (2000) attributes this aggressive and pro-active approach to a recognition within the radio industry that in the early to mid 1990s radio as a medium had entered a period of decline and could be swiftly overtaken by new digital services if it did not adapt to the new environment. The representative industry group, DRRI put forward the argument that 'Every communication medium is embracing the superior quality and increased capacity made possible by digital technology. In today's competitive marketplace, radio must keep pace, providing the highest quality of sound and an array of new and appealing services that ensures that radio remain a dynamic media.' In this context, DAB was represented 'as a revolutionary audio broadcasting technology, which dramatically improves sound quality, and signal reliability and will enable you to receive a host of new services through your radio'.⁷ Against the background of increasing competition from the web and the potential threat from other digital audio services, DAB was heavily promoted as the best technology available:

DAB delivers a variety of fundamental benefits. Based on Eureka 147 technology, it has numerous advantages over both current analogue

transmission and the more recent audio streaming via the World Wide Web. "digital" offers both outstanding CD quality sound and portability. It will lead to host of data display services for the consumer including geographic positioning, traffic and weather information, advertising supplements, song credits and a good deal more. All the while the listener is treated to interference-free reception. DAB's "point to multi-point" capabilities serve to illustrate the Web's "point-to-point" limitations and afford digital radio stations the opportunity to play to a much wider audience. (Bray 2000)

There were also a number of important economic arguments, from an industry point of view, in favour of DAB. Following the initial investment in new transmission equipment, there would be greatly reduced operating costs for broadcasters given the much lower power requirement for DAB compared to FM and AM. The potential for new pay or subscription-based services were also an important incentive as a means of growing radio revenues. In addition, however, there was also a sense of the inevitability of the transition to digital and a fear that not being part of this would severely jeopardize radio's business foundation. As expressed by one commentator in 2000:

The success of DAB is critical to broadcast owners as the only way to protect the value of their properties. It is inevitable that AM and FM must give way to superior technology. After extensive research, the logical next step clearly appears to be DAB. Current license holders are the first to be granted the new digital licenses by the CRTC. Owners thereby continue to hold and control an extremely valuable portion of the broadcast "real estate". (Bray 2000)

The pro-digital radio lobby in Canada could claim considerable optimism for the prospects for DAB in Canada in its initial inception phase. The groundwork and development for DAB in Canada was described as a textbook case of cooperation among the many players involved (Chouinard, 1994: 79). The relatively small group at DRRI who pioneered and championed the cause of digital radio and DAB in particular, ensured that the technology had been perfected and standardized, the necessary spectrum had been obtained and generally a solid foundation was in place for large scale implementation (Edwards 2001). Once the process moved out of the planning phase and into domain of implementation subject to market conditions and consumer behaviour, it would become more diffused and uncontrolled but, it was hoped, with sufficient marketing, public information and availability at a reasonable cost, consumers would be clamouring 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 some 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. By 2002, the CAB's vice president of radio could confidently declare that sufficient progress had been made to 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 coverage of DAB nationally in 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 dropping below the psychologically all important \$100 became available.

What went wrong for DAB in Canada?

Despite many positive early indications, DAB in the succeeding years has clearly not lived up to expectations nor developed in Canada in any sustained way. Officially, there are currently 73 licensed DAB stations in Canada, of which 62 are fully operational: 25 in Toronto, 15 in Vancouver, 12 in Montreal, 6 in Windsor, and 4 in Ottawa serving nearly 11 million potential listeners. However, listenership is low and not even monitored by BBM Canada. DAB receivers are not readily available either for home, portable or car use. Industry professionals are generally despondent and regard the ten years since 1995 when DAB was first rolled out as an unproductive, stalled or even failed period of development.⁸ In common with the experience of other countries, the project of digital radio based on a single platform such as Eureka-147 is now being called into question with little prospect of it being revived any time soon. There are a number of complex reasons underlying this which call into question some of the initial assumptions made about the roll out of DAB in Canada as well as

additional external factors over which it could be said there was very little control. From this emerge some lessons from the Canadian case which will find resonances elsewhere and ultimately have some important implications for the consideration of the digital future of radio as a medium. Reasons underpinning the failure of DAB in Canada can be grouped under three headings: the lack of consumer response; sectoral or industry responses; and policy issues.

Consumer Response

In the first place there was a very poor consumer response to the development of DAB in Canada and at no time over its 10 year history could it be said that digital radio firmly took hold. There was poor awareness of the service, or indeed even the existence of the new technology and 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 take up of DAB in Europe. Despite the promotional activity of DRRI as the mandated body 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, audiophile image which proved difficult to subsequently to shake off. Lower cost receivers once they reached the market performed poorly adding further difficulties to any potential increase in supply of receiver equipment. The issue of receiver availability cuts to the core of the issue around digital radio in that with an installed base of approximately 75 million AM/FM receivers, consumers needed very compelling reasons to change to a new and relatively untested technology.

With the poor availability of consumer 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 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 nearly all markets and especially so in Canada. Some industry figures maintain that this was a failure of marketing but it remained a chicken and egg problem compounded by a lack of interest by manufacturers to invest in new product lines pending greater consumer demand. It was also the case that many of the promised additional data services did not arrive

either with many stations sticking conservatively to a simulcast of their analogue services. Despite initial enthusiasm for the possibilities of data services, with the exception of CHUM, none really materialized.

Of particular significance to the Canadian market was the ultimate failure to deliver DAB as a standard feature of the automobile market. Given the importance of automobile radio listening in North America generally, the tie-in with OEM (or original equipment manufacturers) for the automotive sector was crucial to the successful adoption of DAB. The surprise success of DRRI 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 engineering a segregation of the Canadian market for those areas where DAB was available. According to DRRI's president at the time, what General Motors required was a commitment and a timetable for the roll-out on a national level of DAB to enable them to commission digital receivers as standard equipment across their entire range.⁹ When this wasn't forthcoming, General Motors pulled back and like the rest of the sector began to adopt 'a wait and see' approach.¹⁰ As a result, the only option available for DAB in-car listening was an after-market installation of a new receiver which proved unpopular, adding to low profile of DAB in the marketplace.

Industry Support

From a sectoral perspective, a major question mark over the decision to adopt Eureka-147 began to emerge once it was clear that the US were proceeding in a different direction. Canada's decision to adopt L-Band DAB was made in the knowledge that this would not be followed in the United States as most of that spectrum was unavailable or already allocated for military purposes. The initial response of the National Association of Broadcasters (NAB) in the United States to L-Band DAB using Eureka-147 was positive, and the system was acknowledged to have performed well in all tests. Difficulties began to emerge as early as 1992, however, when the implications of developing a replacement technology for the United States market were considered. Major concern was expressed about the impact of a new technology on existing FM stations in the most developed markets. Under pressure from industry interests, therefore, US policy was constrained by the need to develop a digital system that would disrupt the existing service in any way. The fact that DAB was a

European-originated technology ill-equipped to meet the different needs of the US market,¹¹ in addition to the potential disruptive spectrum allocation difficulties that might be experienced ensured that by 1992 DAB was off the agenda in the United States. In due course, the adoption of IBOC, the proprietary in-band, on channel technical solution developed by iBiquity Digital Corporation, placed Canada and the US squarely at odds with radically different approaches to digital radio broadcasting.¹² It was assumed that as radio was primarily a local medium, the fact that competing and incompatible systems were being used either side of the border would not matter in the end. Experience has shown, however, the difficulty of Canada pursuing a different course to its near neighbour and without doubt the adoption of IBOC in the United States even with its technical limitations contributed to the growing unease among industry members about the wisdom of their DAB policy. In spite of the fact, that the Eureka 147 DAB approach is acknowledged to be technically superior, many industry executives now openly admit that successful implementation of IBOC in the United States would present a new scenario for considering its suitability for Canada.

An interesting argument made in favour of accepting IBOC in Canada illustrates the change in thinking around the transition to digital radio.¹³ Given the robustness of FM analogue broadcasting and wide consumer satisfaction with the quality it provides, it has been argued that IBOC may be 'good enough' and potentially an expedient and pragmatic solution to incrementally making a transition to digital broadcasting, while building on the success of FM. Admittedly, IBOC has a lower bitrate compared to DAB and much less data handling capacity, yet for all that the additional features that DAB has promoted heavily have proven not to be of significant interest to listeners. The IBOC solution, focuses on the core business of radio as transmitting localised audio programming and if IBOC under its brand name of 'HD Radio' provides an enhanced listening experience attractive to listeners, then the Canadian industry would be foolish not to follow suit. This argument would gain even greater urgency should IBOC prove sufficiently successful and with sufficient penetration of reception equipment to promote discussion of analogue switch-off date as is the case with digital television.

Further objections to DAB likewise began to be raised following DRRI's engineering study to extend DAB coverage. The proposal to establish a transmission network in a series of corridors between major metropolitan centres in order to reach a broader section of the population emerged as a prohibitively expensive proposition. Three corridors had been identified: in the Vancouver region; Calgary to Edmonton; and a Windsor to Quebec city corridor in order to achieve 65% to 75% coverage of the Canadian population at a cost of 145 million dollars. One of the interesting outcomes from the corridor study, was that it became abundantly clear that the kind of coverage achieved with L-Band DAB was very similar to the coverage of a cellular infrastructure with high field strength areas near the transmitter and then two or three zones of lower strength signal. The practicalities of using L-Band DAB as a replacement technology for the more powerful 'C' Class FM 100kW transmitters began to look more and more improbable in the Canadian topography or at least at a cost to coverage ratio that made little sense.¹⁴

Ten years on from the formal launch of DAB as the digital standard in Canada, the actual level of support for the project from industry has been called into question. While there was strong initial enthusiasm for what DAB had to offer in the early 1990s and a high level of initiative and support lent by private broadcasters to the project, its failure to take off on a more general level either internationally or in the Canadian market led to a gradual cooling of enthusiasm if not outright withdrawal of support. Once the US had decisively rejected DAB, an analogy began to be drawn with the ill-fated AM Stereo technology that had been unsuccessfully attempted in the 1980s and in which the industry had suffered some major losses. Thus, psychological brakes began to be applied at a relatively stage despite the fact that the industry had agreed a digital transition policy and a strategy for its implementation. Steve Edwards, one of DAB's longtime supporters in Canada, pointedly observes that with all of the supposed commitment to the project, more money was spent by his company on upgrading a small rural station from AM to FM than was invested in ten years on DAB.¹⁵ The restructuring of DRRI and the effective winding up of its promotional and marketing activities in 2004 was formal acknowledgement of the changed attitude towards DAB. Effectively subsumed within the Canadian Association of Broadcasters, DRRI would continue to have a monitoring and advisory role, as well as

a watching brief on existing L-Band spectrum allocation, but with no new initiatives planned for the advancement of DAB in Canada.¹⁶

The overall rather restrained level of support from the industry for DAB was in particular evidence in the relatively low profile adopted by CBC, the national public broadcaster. In contrast to the United Kingdom, where the BBC has played a leading role in the development and the roll out of the technology or in Singapore where the Singapore Broadcast Authority has likewise been to the forefront of DAB implementation, CBC has been a participant rather than a leader in DAB. 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 in the sense of pioneering new programme strategies or lending major promotional support to the project. DAB was effectively co-opted as one of a number of options in an overall new media strategy which included the web, subscription digital audio services via cable and more recently satellite broadcasting. In part due to the downsizing of the engineering function within CBC (Lavers, 2006), the emphasis for the corporation was a programming one and was based on a commitment to make programming available across all new platforms, not just DAB.¹⁷ While CBC is now experimenting with newer applications such DMB (Digital Multimedia Broadcasting) using DAB technology, its interest in digital terrestrial radio *per se* has waned considerably.¹⁸

Policy Considerations

A conclusion offered by many participants in this study was that the policy developed for the transition to digital, while perhaps appropriate for the time, was based on a number of false assumptions which proved over the succeeding years to be the wrong decisions for the Canadian radio industry.

The central feature of the policy towards a digital transition was that DAB would be a *replacement* technology for analogue AM and FM transmission. This approach was determined by the industry itself and had its origins in the desire to improve the quality of AM broadcasting which continues to be an important of the Canadian

broadcast landscape. Industry representatives were also concerned that unless the digital transition was managed on the basis of a replacement of the existing transmission network, a licensing round for L-Band spectrum would be likely to bring a series of new entrants to the marketplace who could potentially disrupt the entire industry. In a not dissimilar situation to the United States where incumbents based their entire strategy on preventing any new competition and for this reason adopted a system that worked within an existing waveband, the Canadian strategy was premised on the assumption that a rapid transition would take place and that all existing broadcasters would migrate to the digital domain.

The regulatory framework for digital radio was based on this assumption and as a result 'transitional' licenses were issued to all incumbents who wished to upgrade their transmission services to digital, on the understanding that this was for the purposes of simulcasting existing signals over the transitional period. However, no timeline was in put in place and the roll out of DAB from the start was ill-defined. From a regulatory point of view, the CRTC agreed a two-staged process. In the first instance, experimental licences granted stations the right to use a digital channel for simulcasting but were prohibited from using the ancillary (data) channels available for programming or for any service that would compete with or degrade the primary programming signal. A broad process of public consultation would follow, initially estimated within a period of three years, to develop the long term digital radio policy.¹⁹

The lack of flexibility given to experimentation with new content derived in part from ownership rules governing radio in Canada which restricts companies from owning more than two AM and two FM holdings in any one market. The transitional licence was not considered an additional service for ownership purposes, at least for the transitional period. Substantial new programming would however constitute a new service and incumbents who wished to develop new digital-only services would have to relinquish some of their valuable existing analogue services. The CRTC having granted incumbents priority access to new digital channels in the first place could not increase that allocation further for the purposes of experimental digital programming and, in any event, had to protect the public interest and ensure diversity in the broadcast landscape. What has emerged subsequently is a form of regulatory

paralysis with an initial allocation of spectrum and licensing and no further room for manoeuvre until substantial progress has been made in the development of a proven service.

This transitional regime has in effect continued to the present and no consultative process of long term strategy for digitalization has ever been instituted. The restrictions placed on experimental licences remain in effect, preventing the development of new programming services and limiting additional content to alphanumeric text. Few, if any, new entrants have been licensed and the lack of any permanent licensing structure has meant a lack of interest on the part of investors in developing new digital services on the DAB platform.

The issue of stand-alone licences for DAB has been a contentious one and illustrates the kind of stalemate that the industry as a whole is experiencing on its digital policy. Interestingly, the pressure for additional, digital only licences has come not from within the mainstream broadcast sector but from the field of ethnic broadcasting. With an expanding diverse and multicultural population in each of its major cities, there has been an ongoing and increasing demand for the provision of new ethnic broadcast services.²⁰ Over half the population of the greater metropolitan area of Toronto, for instance, is comprised of ethnically diverse communities with some 55 distinct ethnic groups in over 45 languages. While currently there are 6 full service ethnic radio stations, there is enormous demand for new services. Additional niche ethnic broadcasting has been provided by the use of SCMO (subsidiary communications multiplex operation) services, using ancillary spectrum capacity available on FM and leased by existing broadcast licence holders. Special receiving equipment is required for the service but its success as demonstrated by the 12 SCMO operations in the Greater Toronto Area has shown the potential of new channels using dedicated technology for specific niche applications or community uses.

In 2003, the first stand-alone DAB radio service, Sur Sagar Radio Inc. was licensed in the Toronto areas to deliver a service aimed at the South Asian community in the region, broadcasting in Punjabi, Hindi, Urdu and Gujarati, as well as English. The CAB objected to the license application on the basis that stand-alone licences were not appropriate given the embryonic stage of the DAB sector.²¹ The CAB feared, and

argued as such with the CRTC, that opening up the licensing of stand-alone digital stations would initiate a ‘gold rush’ for spare spectrum, before the business case had been established or proven. It appealed again to the market-driven approach outlined in the *Policy for the Introduction of Digital Radio* (1995) which protected the current structure of the industry pending a full and complete transition to digital. In reply, Sur Sagar argued that a new approach to digital radio was now required which would be based on programme innovation, and risks being taken by new entrants to the market in order to counteract the stalled implementation of digital radio. In strongly worded terms, Sur Sagar argued that the spectrum was “public property, not the private reserve of those who have experimented.” The CRTC’s supported the case and justified a one-off licence on the basis that “offering an entire schedule of unique programming for a specialised audience adds value to digital radio and could advance the rollout of the special receiver necessary to receive such programming.”²² This was an important decision and one which could have important consequences for a reorientation of DAB policy. Operational difficulties have to date however hindered the development of the Sur Sagar service and the success of its implementation remains uncertain.²³

A coda of sorts to this phase of DAB in Canada is provided by the proposal of CHUM Ltd., the Canadian communications conglomerate, to provide a subscription radio service across Canada on a DAB network. Satellite radio 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.²⁴ With knowledge of the impending entry of both satellite giants, a third application for a terrestrial digital subscription service was submitted by CHUM and also approved though subsequently never launched. Controversially, where 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’s proposal was for a terrestrial DAB service with conditional access, and providing 50 channels initially, subsequently growing to 100 channels for a \$9.95 CDN monthly subscription. CHUM signed a technology agreement with RadioScape in the UK to develop receivers specifically for the subscription service which could

also be used to pick up regular, non-subscription DAB channels. Receivers would also include a card slot for adding removable memory for recording, a RAM cache for live-pause and replay features, and an integrated receiver/MP3 player, designed specifically for the youth market. In order to achieve the density required to allow a 50 channel service in addition to current DAB allocations for AM and FM replacement, the data compression ratios would be reduced to 128 kbps for stereo from its current 256 kilobits per second. More advanced codecs providing an approximate doubling of spectral efficiency), and /or the allocation of a "modest amount" of additional spectrum beyond the current 1452-1492 MHz DAB band were also proposed (Pizzi 2005).

CHUM's submission argued that its proposal would work with conventional radio by acting as a complementary service, providing a platform for greater industry involvement as content partners and, crucially, would play an instrumental role in driving penetration of digital radio by bringing to market affordable and technologically advanced receivers. Citing the contrast with the UK, where DAB has been a success story, CHUM argued that the missing Canadian element was content and that this proposal contained the appropriate mix of innovative, Canadian-produced content to drive a successful digital transition.

CHUM's service is a really a case of 'what might have been' and much of the industry response to the proposal considered it a 'spoiler' application against the two dominant satellite bids which had already made inroads into the Canadian market.²⁵ While it addressed salient issues in respect of Canada's policy in digital radio and offered a pro-Canadian solution to leading the digital transition, the response of the regulator, which was to effectively let the market decide, underlined the weakness of the Canadian position in digital radio. Decisive intervention in progressing the digital transition was effectively led by developments in the US, initially by its rejection of DAB and development of an in-band solution and subsequently with the encroachment of US satellite footprints on the Canadian marketplace. The fact that no special protection was afforded the Canadian approach in 2005 effectively spelt the end of the strategy of migrating the industry onto the Eureka 147 platform.

Future Options for DAB

Summing up what has been a long and unproductive ten years 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.²⁶

Michael McEwen, former CBC radio executive and past president of the World DAB Forum, described four conditions required for a successful transition to digital. The first condition is spectrum availability for the proposed new digital transmission environment. The second is a commitment from broadcasters to fill that spectrum. Thirdly, listeners need a value-added incentive to buy into the service with enhanced programming, data and ancillary services. And finally, a commitment is needed from the consumer electronics industry to ensure a near-ubiquitous supply of consumer electronic devices at affordable consumer prices. Unless these four conditions were met, each would in some way become a barrier to a successful transition. In the case of Canada, it could be argued that there was market failure in three out of the four.²⁷ The assumption that the superior audio quality of DAB alone would drive the transition from analogue to digital, as CD had achieved a replacement of vinyl, was unfounded. Analogue broadcasting and FM in particular have proved remarkably robust and its quality such that the differentiation between DAB and good quality FM was not significant. Rather than replacement of one platform for another, the experience has in fact been over the period concerned an insatiable demand for new and additional services to the extent that capacity, particularly in FM, has been reached in most major markets.

Despite this, most executives agree that DAB will have some role in the future of digital radio in Canada. If for no other reason than the fact that a network is in place and stations have been allocated valuable shares of L-Band spectrum, there is a sense that a number of potential future applications are possible for DAB in Canada. Following the lead of the proposed CHUM digital subscription service, many of the

leading players in what is now a highly converged radio sector with four main corporations controlling the vast bulk of the industry are now well positioned to introduce new, value-added additional services as a spin-off from conventional core broadcasting business. The regulatory provision does not at present provide for such applications and given strict ownership rules operators are disincentivised from deviating from analogue broadcasting.

In its long promised review of the commercial radio sector, the CRTC has now formally incorporated a review of the transitional digital radio policy and called for submissions different aspects of the 1995 policy.²⁸ Acknowledging the stalled switch-over, the CRTC asks whether the replacement strategy should now be reconsidered and if so what the status of existing DAB stations now in operation should be. It asks whether the policy should now be modified to enable new entrants into the market, specifically if digital radio could provide better services for diverse cultural and ethnic communities, and how additional DAB spectrum might be obtained or made available. However, DAB is no longer treated as the sole transitional digital platform and the policy framework now directly address the issue of whether IBOC should be permitted in Canada as well as asking what provision should be made for other standards, such as DRM, DMB, and DVB-H. In addition, new and emerging Internet distribution platforms such file-sharing, podcasting, downloading, and audio streaming, including fixed locations and wireless systems such as Wi-Fi and WiMAX and the promise of Internet-based services for car reception, all radically change the nature of any proposed digital transition. In the words of the commission, ‘the new audio programming alternatives pose an unprecedented challenge for the conventional radio sector that will require astute business decisions and a judicious regulatory approach’.²⁹

In its submission to the CRTC, the Canadian Association of Broadcasters supports the abandonment of the ‘replacement technology’ notion of digital radio broadcasting and advocates a flexible regulatory approach as the central element of a re-vamped policy for digital radio.³⁰ A long term strategy is required, the CAB argue, to ensure that radio services of national, regional and local interest, will continue to be delivered reliably and free of charge to fixed, portable and mobile services. The digital transition policy, therefore, remains crucially important when set against a

background of declining audiences particularly among younger listeners for conventional radio, as well as the ongoing fragmentation of the market by unregulated, Internet-delivered audio services. Flexible arrangements enabling stations to experiment with innovative programming models and ideas would, it is argued, provide a much needed boost for attracting listeners to digital and should include a relaxation of Canadian content regulations for digital services, at least until meaningful listenership levels were achieved, and more flexible consideration of ownership rules, enabling stations to experiment on their digital services without having to relinquish an equivalent property. While new programming is proposed as a driver for any new impetus on the terrestrial digital radio broadcasting, simulcasting as appropriate is also envisaged as a means of encouraging migration of analogue to digital. The analogy is drawn with the migration of AM to FM in the 1950s and 60s whereby a gradual increase of peak-listening programming was successfully transferred to the FM band, once initial listenership began to take hold. Perhaps not surprisingly, the CAB argue that incumbents are best positioned to provide programming services and advocate continued priority given to existing broadcasters to digital allocations. However, new entrants are acknowledged to have a role and a mechanism for releasing unused spectrum by current licence-holders is proposed. More efficient use of the spectrum whether through AAC source coding and/or reviewing the current generous data rates of 256 kbits/sec would also free up considerable room for expansion and enable the kind of quantity envisaged for digital programming services on a par with equivalent Internet or satellite-based services.

Prior to the formation of new Canada-wide policy for digital broadcasting, it is accepted that there is now no longer one simple solution. As the CAB argue in their submission:

It is 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.³¹

A successful transition to digital in the Canadian context will be based on a 'good value proposition' that includes new content, affordable receivers, promotion, and competitive technical features. It will continue to include DAB as part of the equation

but one which is as likely to include variants of the Eureka 147 system, as well options for IBOC, Internet distribution and technologies for distribution to hand-held mobile devices.

Conclusion

Drawing together the many different issues that have arisen over the course of the transitional digital radio era in Canada, the following may be advanced as some of the over-riding lessons of the Canadian experience.

1. In the first instance, the experience of Canada in attempting to implement DAB illustrates the classic disadvantage of being an early adopter of new technologies. Canada's early and leading role in DAB implementation was well established. It participated actively in the World DAB forum, a leading Canadian executive serving as President, as well as in the respective technical standards groups. It succeeded in galvanising wide industry support including relevant government, private and public broadcaster interest and developed a coherent strategy based on the information available at the time and the context in which radio operated. However, as discussed in the foregoing, all of this came to nought with the lack of availability of receivers and insufficient development of receiver technology.
2. The second lesson that can be drawn from the Canadian experience is its illustration of the difficulty of the broadcast regulatory regime or framework keeping pace with technological change. Canada's transitional digital radio policy was set in 1995 and based solely around the implementation of DAB as a replacement technology AM and FM. It did not, or could not, take account then or subsequently of the increasingly complex technological domain that broadcasting was facing, including the development of IBOC in the US, advances in compression technologies for transmission, Internet distribution and new developments in multimedia broadcasting. The regulatory gap was particularly exposed with the launch of satellite radio and the manner in which it made its entry into the Canadian broadcast environment. The licensing of the XM and Sirius satellite platforms showed how unprepared the Canadian

system was for effectively predatory encroachments on platforms that had not been previously planned for.

3. It might be argued that the example of how the digital transition has been handled in Canada points up the weakness of a laissez-faire or market-driven approach. The regulatory position of the CRTC combines a responsibility to defend the public interest as well as to respond to the business needs of the sector. Its transitional digital radio policy was based on facilitating an industry-led initiative on the road ahead. The disadvantages of this approach have already been discussed with particular reference to the potential conflicts involved when incumbents have responsibility for developing long term policy. Neither the regulator nor the public broadcaster in the Canadian example intervened to adopt a more direct or leadership role in the roll-out of a digital policy. This, arguably, is in contrast to the more successful interventionist approach adopted in the UK.
4. Fourthly, as illustrated by the Canadian experience, the transition to digital broadcasting is not simply one of replacement technology. Where the debate up to and including 1995 envisaged a total migration of the radio broadcasting landscape onto a fully digital system, the reality has been shown to be much more complex. Unlike the case of television where there is an industry momentum towards realising a digital system and a gathering consensus around analogue switch-off deadlines, the same can not be said for radio. Digital broadcasting for the foreseeable future will be complementary to conventional analogue broadcasting and its strategy will be tailored as such.
5. As a follow up, it can be seen from the case of digital radio in Canada that analogue broadcasting and FM in particular has proved to be remarkably robust, reliable and successful as a means of providing free to air broadcast services. The supposed greatly enhanced audio quality of DAB was not sufficient or sufficiently significant to enable the digital transition in Canada. With a huge installed user base of at least 70 million receivers in Canada, as well as considering the ease with which FM receivers can be incorporated into cell phones and mobile devices, it will be a considerable time before the issue

of replacement returns to the agenda. Indeed, in contrast to many European markets, the Canadian radio market shows how underdeveloped many FM markets are in the European context and scope that exists for further development.

6. As shown in other markets also, Canada is further proof of the acknowledgment that the transition to digital radio will take longer than any one originally thought.

References

- Ala-Fossi, M. and Stavitsky, A. G. (2003) "Understanding IBOC: Digital Technology for Analog Economics", *Journal of Radio Studies*, 10 (1) 63-80.
- Barboutis, C. (1997) "Digital Audio Broadcasting: The Tangled Webs of Technological Welfare", *Media, Culture & Society*, 19 (4).
- Dick, J. H. and Ryu, S. J. (2003) "Broadcast Via the Internet: Technology, Market, and the Future.", *Trends in Communication*, 11 (2)155.
- DTI (2004) *The Future of Radio - A Mission to the USA*, London: DTI.
- Evans, C. J., Smethers, J. S. (2001) "Streaming into the Future. A Delphi Study of Broadcasters' Attitudes Toward Cyber Radio Stations", *Journal of Radio Studies*, 8 (1) 5-27.
- Hakanen, E. (1991) "Digital Audio Broadcasting: Promises and Policy Issues in the USA.", *Telecommunications Policy*, 15 (6).
- Hendy, D. (2000) "A Political Economy of Radio in the Digital Age", *Journal of Radio Studies*, 7 (1) 213-234.
- Kozamernik, F. (2004) "DAB - From digital radio towards mobile multimedia", *EBU Technical Review*, No.1.
- Lax, S. (2003) "The Prospects for Digital Radio", *Information Communication & Society*, 6 (3).
- Martínez-Costa, M. D. (2004) "Digital Radio in Europe", *Quaderns del CAC*, (Issue 18).
- Oakes, D. (2005) "Digital Radio on the Horizon?" *Broadcast Dialogue*, (February).
- Parnis, D. (2000) "Tuning in the future: Digital technology and commercial radio broadcasting in Canada", *J. Can. Stud.-Rev. Etud. Can.*, 35 (3) 231-250.
- Pizzi, S. (2004) "Rethinking DAB North of the Border", *Radio World Online*, (8.11.04).

ENDNOTES

¹ Research for this project was supported by the Ireland-Canada University Foundation. The author was a recipient of the 2005 Glen Dimplex Award and spent 5 weeks in Canada in July/August 2005 for fieldwork associated with this research.

² See YLE press release, 24 February, 2005. Available:

http://www.yle.fi/fbc/press_abandonadab.shtml

³ Task Force on Digital Radio. *The Sound of the Future. The Canadian Vision*. Ottawa: Minister of Supply and Services, 1995.

⁴ Interview with Steve Edwards, Rogers.

⁵ Public Notice CRTC 1995-184 *A Policy To Govern The Introduction Of Digital Radio*. Available: <http://www.crtc.gc.ca/archive/ENG/Notices/1995/PB95-184.HTM> (April 2006)

⁶ See Bray (2002) 'DAB', *Broadcaster* February.

⁷ From the official web-site of DRRI. Available at: www.digitalradio.ca (April 2006).

⁸ Interview with Kirk Nesbitt, Rogers.

⁹ Interview with Duff Roman, CHUM.

¹⁰ A conflict would late emerge that with General Motor's shareholding in XM satellite radio, in due course a competitor against DAB and conventional radio in the Canadian market. As such its whole support was always going to be unlikely.

¹¹ Daphne Lavers, independent media analyst was forthright in her view that DAB in Canada was effectively killed off by the Americans at NAB in 1992 when the technology was rejected outright as 'European' and 'socialist'. Interview with the author.

¹² See Federal Communications Commission 'Digital Audio Broadcasting Systems and their Impact on the Terrestrial radio Broadcast Service', FCC 02-286. Available at:

http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-02-286A1.pdf (April 2006)

¹³ Quite a number of participants in the research volunteered that while it was official Canadian policy, IBOC was being watched closely and if it proved a success would necessitate a rethink on the part of Canadian broadcasters and regulators.

¹⁴ Interview with Ray Carnovale, CBC.

¹⁵ Interview with Steve Edwards, Rogers Communications

¹⁶ See DRRI Communiqué, 28 July, 2004 'Digital Radio Roll-Out Inc. Restructures to Address New Mandate'. Available at: http://www.cab-acr.ca/drrr/news/nr_jul2804.pdf (April 2006).

¹⁷ See O'Neill (2006) for a further discussion of CBC's new media strategy.

¹⁸ Interview with Ray Carnovale, CBC.

¹⁹ Public Notice CRTC 1995-184 *A Policy To Govern The Introduction Of Digital Radio*. Available: <http://www.crtc.gc.ca/archive/ENG/Notices/1995/PB95-184.HTM> (April 2006)

²⁰ The Broadcasting Act 1991 requires that Canadian broadcasting should reflect 'should reflect the multicultural and multiracial nature of Canadian society' and makes provision for a distinct category of ethnic programming. A diverse range of services utilising over the air and specialised networks is provided for. See Public Notice CRTC 1999-117 *Ethnic Broadcasting Policy*. Available at: <http://www.crtc.gc.ca/archive/ENG/Notices/1999/PB99-117.HTM> (April 2006).

²¹ See CRTC Broadcasting Decision CRTC 2003-118 *Stand-alone ethnic transitional digital radio undertaking in Toronto*. Available at: <http://www.crtc.gc.ca/archive/ENG/Decisions/2003/db2003-118.htm> (April 2006).

²² See 'First Stand-Alone DAB' *Broadcaster* 1 May, 2003. Available at:

http://www.broadcastermagazine.com/issues/1sarticle.asp?id=100875&story_id=170205160728&issue=06012003

²³ Sur Sagar Radio Inc has subsequently applied on three successive occasions to extend the deadline for launching the service. Its most recent deadline to launch by March 2006 has passed. See CRTC *Broadcasting Public Notice CRTC 2005-56*. Available at:

<http://www.crtc.gc.ca/archive/ENG/notices/2005/pb2005-56.htm#8>

²⁴ See O'Neill (2006) for further analysis of the dispute surrounding the licensing of satellite radio in Canada.

²⁵ This was a common response among many of the participants in the study despite the support for CHUM's pro-Canadian stance.

²⁶ Interview with Gary Slaight, CEO Standard Broadcasting Inc.

²⁷ Interview with Michael McEwen, August, 2005.

²⁸ Broadcasting Notice of Public Hearing CRTC 2006-1, *Review of the Commercial Radio Policy*. Available at: <http://www.crtc.gc.ca/archive/ENG/Hearings/2006/n2006-1.htm> (April 2006)

²⁹ Ibid.

³⁰ Canadian Association of Broadcasters (2006) *Then...Now; Private Radio's Changing Realities*. Submission of CAB to Broadcasting Notice of Public Hearing CRTC 2006-1, *Review of the Commercial Radio Policy*. Available at: <http://www.cab-acr.ca/english/radio/rreview/submission.shtm> (April 2006).

³¹ Appendix F *Observations and Comments on the Digital Transition*, p. 2. Available at: <http://www.cab-acr.ca/english/radio/rreview/submission.shtm> (April 2006).