The International Indigenous Policy Journal

Volume 2 | Issue 2 Article 2

June 2011

Digital Divides and the 'First Mile': Framing First Nations Broadband Development in Canada

Rob McMahon Mr.
Simon Fraser University, rdmcmaho@ualberta.ca

Susan O'Donnell Dr.
University of New Brunswick, susanodo@unb.ca

Richard Smith Dr.
Simon Fraser University, smith@sfu.ca

Brian Walmark
Keewaytinook Okimakanak Research Institute (KORI), brian.walmark@knet.ca

Brian Beaton
Keewaytinook Okimakanak Kuhkenah Network (KO-KNET), brianbeaton@knet.ca

See next page for additional authors

Recommended Citation
McMahon, R. , O'Donnell, S. , Smith, R. , Walmark, B. , Beaton, B. , Simmonds, J. (2011). Digital Divides and the 'First Mile': Framing First Nations Broadband Development in Canada. *The International Indigenous Policy Journal,* 2(2) .
DOI: 10.18584/iipj.2011.2.2.2

Digital Divides and the 'First Mile': Framing First Nations Broadband Development in Canada

Abstract
Across Canada, rural and remote First Nations face a significant 'digital divide'. As self-determining autonomous nations in Canada, these communities are building broadband systems to deliver public services to their members and residents. To address this challenge, First Nations are working towards a variety of innovative, locally driven broadband development initiatives. This paper contributes a theoretical discussion that frames our understanding of these initiatives by drawing on the paradigm of the 'First Mile' (Paisley & Richardson, 1998). We argue that broadband development policy in Canada must be re-framed to address the specific needs of First Nations. The First Mile position foregrounds community-based involvement, control, and ownership: a consideration we suggest has particular resonance for First Nations. This is because it holds potential to move beyond the historical context of paternalistic, colonial-derived development policies, in the context of broadband systems development. We argue First Nations broadband projects offer on-the-ground examples of a First Mile approach, and call for more research in this area.

Keywords
Broadband policy, Broadband networks, Community networks, First Nations issues, Digital Divide, Policy Frameworks, rural and remote broadband

Acknowledgments
The authors would like to acknowledge and offer our thanks to everyone who participated in the discussions and research leading to this paper. We are grateful for the opportunity provided by the Social Sciences and Humanities Research Council's Knowledge Synthesis Grant for a Digital Economy, and hope our research will be useful for the wider federal consultation on Industry Canada's emerging digital economy strategy. The case studies featured in the Putting the 'last-mile' First report featured in this article include the contributions of many individuals working on First Nations and Inuit connectivity in Canada. The authors also thank the Assembly of First Nations ICT Ad Hoc Working Group who invited us to discuss an earlier draft of the Putting the last-mile First report and made several very helpful suggestions. The authors would also like to thank our partners for the Putting the last-mile First report: Keewaytinook Okimakanak in Ontario, Mik'maw Kina'matneway / Atlantic Canada's First Nation Help Desk in Nova Scotia, the First Nations Education Council in Quebec, and the First Nations Technology Council in British Columbia. These partners offered valuable feedback and ideas throughout the project. Finally, the authors thank the anonymous reviewers who provided constructive and helpful comments on an earlier version of this paper.

Authors
Rob McMahon Mr., Susan O'Donnell Dr., Richard Smith Dr., Brian Walmark, Brian Beaton, and Jason Simmonds Dr.

Introduction

Across Canada, rural and remote First Nations face a significant 'digital divide'. As self-determining autonomous nations in Canada, these communities are faced with the task of building broadband systems to deliver public services to their members and residents. To address this challenge, First Nations are working towards a variety of innovative, locally driven broadband development initiatives. This paper draws on the paradigm of the 'First Mile' (Paisley & Richardson, 1998) to help structure our understanding of these initiatives. We argue that broadband development policy in Canada must be re-framed to address the specific needs of First Nations. The First Mile position foregrounds community-based involvement, control, and ownership: a consideration we suggest has particular resonance for First Nations. This is because it holds potential to move beyond the historical context of paternalistic, colonial-derived development policies, in the context of broadband systems development. We argue First Nations broadband projects offer on-the-ground examples of a First Mile approach, and call for more research in this area.

Differing levels of access to broadband infrastructure and connectivity services exist across Canada. Large metropolitan centres such as Toronto and Vancouver have broadband systems in place that enable many residents to enjoy widespread access to broadband. Outside of major population centres many rural and remote communities, including First Nations, remain comparatively underserved. These realities demonstrate the persistence of various digital divides in Canada. "Digital divides" refer to disparities among different population groups or geographical regions in their access to broadband systems (Norris, 2001).

However, alongside ongoing discrepancies in access to broadband, individuals and communities across the country are working to address these challenges through innovative, locally driven initiatives. This paper contributes a theoretical discussion that situates and frames an understanding of why First Nations would want to get involved in broadband development initiatives and the significance of their activities. The "First Nations communities" we are referring to in this article are groups of people with distinct status as self-governing nations in Canada, and are located in specific geographic locations, also known as reserves. While we recognize that many members of the large and growing urban First Nations population face barriers to access to and use of broadband systems, this paper focuses on rural and remote First Nations communities and the specific digital divides they face vis-à-vis urban communities.

The discussion applies the paradigm of the 'First Mile' development to the many locally-driven First Nations broadband initiatives currently underway. The First Mile approach to broadband development policy re-frames the decision-making process to emerge from rural and remote local communities (Paisley & Richardson, 1998). Proponents of a First Mile approach argue that plans to address disparities in access to and use of broadband systems are almost always designed through processes generating from centralized institutions located far from local communities. Such processes often exclude community members in network planning and implementation (Ramirez, 2001; 2007). In some cases, such 'last-mile' approaches build on solutions flowing from metropolitan centres. The last-mile approach frames the differences between rural and urban communities as 'problems' or 'shortcomings' to be addressed by simply linking unserved communities to already-existing systems and infrastructures. In contrast, the First Mile approach argues that first and foremost, decision-making about broadband development must be grounded in and emerge from the specific needs of local communities. The broadband policy-making process then becomes an opportunity for community members to articulate and address their needs, before technical development and planning takes place. This position seeks to re-frame solutions to the 'digital divide' in ways that support community-based involvement, control, and ownership.

We suggest that the First Mile approach to broadband policy development has particular resonance for First Nations communities in rural and remote regions. To move beyond the historical

context of paternalistic, colonial-derived development policies, the First Mile recognizes that First Nations communities and governments are best positioned to decide when and how they access and use newly developing technologies, including broadband systems. This position reflects statements expressed by Indigenous peoples in international fora like the World Summit on the Information Society (Fiddler, 2008). It is also an important component of Indigenous-led broadband development projects in countries like Australia (Hartley, 2004; Landzelius, 2006; Leclair & Warren, 2007), the United States (Morris & Meinrath, 2009; Sandvig, 2012), Canada (Fiser, 2010; Mignone & Henley, 2009; O'Donnell, Milliken, Chong & Walmark, 2010; T. Whiteduck, 2010) and elsewhere. We argue that these various Indigenous community-driven initiatives offer on-the-ground examples of a First Mile approach to broadband development policy.

Research on First Nations Community-Driven Broadband Initiatives

Research on First Nations broadband initiatives is currently in its infancy. Although considerable research on First Nations telehealth programs and projects, and some research on distance education initiatives in these communities, has been published (see for example Carpenter & Kakepetum-Schultz, 2010; Gideon, Nicholas, Rowlandson & Woolner, 2009; Walmark, 2010), there has been very limited in-depth research on community-driven broadband system development initiatives (for some examples, see Fiser 2010; Mignone & Henley, 2009; Sandwig, 2012; J. Whiteduck, 2010).

The most comprehensive overview on the topic is the recent report: "Putting the 'Last-Mile' First: Reframing Broadband Development in First Nations and Inuit Communities" that highlighted examples of First Nations and Inuit communities using technologies to support their community and economic development goals (McMahon, O'Donnell, Smith, Woodman Simmonds & Walmark, 2010). The report synthesized a body of knowledge and research in Canada demonstrating how rural and remote First Nations communities are shaping and using broadband technologies. Funded by the Social Sciences and Humanities Research Council of Canada through a Knowledge Synthesis Grant for a Digital Economy, the report combined a literature review and interviews with 23 individuals involved in First Nations and Inuit broadband development.[1] It employed a participatory research process through which researchers from two universities (Simon Fraser University and the University of New Brunswick) worked in partnership with four First Nations ICT organizations: Keewaytinook Okimakanak Tribal Council (Keewaytinook Okimakanak Council's Kuhkenah Network, KO-KNET, and the Keewaytinook Okimakanak Research Institute, KORI); Atlantic Canada's First Nation Help Desk; the First Nations Education Council in Quebec; and the First Nations Technology Council in B.C.

The report is a broad overview. It was conducted over a short time frame (three and a half months) that only allowed for a general survey and a snapshot of some current projects. Despite these limits, it supported previous research demonstrating a widespread lack of broadband infrastructure and robust connectivity services in many rural and remote First Nations communities (Alexander, 2001, 2009; Fiser, 2010; O'Donnell et al, 2010; Walmark, O'Donnell, & Beaton, 2005). It also supported previous findings that many First Nations are engaged in a range of innovative, community-driven broadband and ICT development projects.

To date, two studies conducted in partnership with Fort Severn First Nation in Ontario are the first published research focused on First Nations community broadband networks that consider First Mile concepts. The first (O'Donnell, Kakekaspan, Beaton, Walmark & Gibson, 2011) describes how Fort

[1] While the original project looked at both Inuit and First Nations communities, since the research team did not include representatives from Inuit organizations, the authors decided to restrict their discussion to First Nations communities and contexts to ensure we do not misrepresent Inuit communities.

Severn First Nation is putting First Mile concepts into action. Working with their tribal council, Keewaytinook Okimakanak, and other strategic partners to develop the broadband networks in the community, Fort Severn has shaped these technologies to meet the community's needs. Community priorities for broadband-enabled services identified more than 10 years ago included network services, education and health. The study demonstrates how today the broadband networks in Fort Severn are cross-sector enablers that support the community's delivery of these core community services and activities.

The second study, on Fort Severn's new cell phone service, found that Keewaytinook Mobile (KM) exists in Fort Severn First Nation because of the leadership shown by KO/K-Net and Fort Severn in developing telecommunication services to meet the community's needs (O'Donnell, Kakekaspan, Beaton, Walmark, Mason & Mak, 2011). The community worked with federal and provincial government and private sector service providers to fund, design and implement the service despite considerable challenges, and KM has built solid business relationships with strategic partners that can be leveraged in future development of the service. In early 2011, KO/K-Net received confirmation that the Northern Ontario Heritage Fund Corporation (NOHFC) would provide the funding to develop the KM infrastructure in 10 more remote First Nations communities in Northwestern Ontario. This will increase the number of First Nation owned GSM cell systems from the current seven to 17 in the region.

Doctoral research is currently underway on another First Mile initiative - the Northern Indigenous Community Satellite Network. NICSN is the result of a jointly managed, inter-provincial partnership between First Nations and Inuit communities in northern Quebec, Ontario and Manitoba (National C-Band Benefit User Group, 2005). It is an example of a regional broadband network that is owned, managed, operated and maintained by 46 First Nations and Inuit member communities and three regional organizations: KO-KNet in Ontario; the Kativik Regional Government (KRG) in Quebec; and the Keewatin Tribal Council, which formed Broadband Communications North (BCN) in Manitoba. To ensure community-level participation in network design, control and administration, these three organizations share management and engineering resources. Managed from the hub earth station in Sioux Lookout, Ontario (which serves as the Internet gateway and network management centre), NICSN partners support each other's autonomy by allowing for different regional network management models (albeit with backbone technology standardized across the network). The group also supports local community-level network management.

Digital Divides and First Nations in Canada

To understand the broader context in which these initiatives are taking place, it is important to outline the overall context of broadband development in Canada, with specific focus on First Nations. Canada has a long history of broadband development. In 1997, it was the only OECD country whose citizens exhibited a measureable uptake of broadband connectivity (Middleton, 2010). However, many communities and individuals did not have access to these newly developing technologies, a condition typically described as the 'digital divide' (Norris, 2001). Early-stage government policies designed to bridge the digital divide focused on quantitative issues of access that aimed to increase measurable levels of ICT diffusion (Unwin, 2009). This goal was supported by the technologically determinist argument that a robust 'information society' would 'naturally' develop through the provision of connectivity and information and communications technologies (ICTs). Critical scholars pointed out this unreflexive approach failed to consider the qualitative, contextual factors that can aggravate the 'digital divide' even in the face of high levels of quantitative diffusion (Schiller, 2007). These contextual factors include socio-economic inequalities between and inside nation-states that limit the abilities of individuals and communities to access and use technologies (Raboy & Schtern, 2010; Shade, 2010;

Wilson, 2008). For example, a diffusionist perspective that fails to develop the local expertise required to manage broadband systems can lead to the (re)production of dependency relationships, with local communities left reliant on external service providers (Alexander, 2005; Mattlelart, 2000; Shapiro, 1999).

In response to these perceived shortcomings, researchers and policy makers in Canada argued for a more holistic definition of the 'digital divide'. These proposals sought to consider the social relations and power inequalities that exist between various stakeholders in technology development. For example, Shade (2010) writes: "while it is acknowledged that access to networks and services should be equitable, affordable, and ubiquitous, it is also recognized that access depends on diverse physical, technical, economic, social and cultural factors" (Shade, 2010, pp.125-6; for other examples, see Clement & Shade, 2000; Howard, Busch, & Sheets, 2010). Matear, 2002; Middleton, 2010; O'Donnell et al, 2009). Norris (2001) offers a summary of this perspective with her three-part definition of the digital divide that includes the global divide (between industrialized and developing societies), the social divide (inside each nation), and the democratic divide (which considers issues of technological ownership, control, access and use) (p.4). These kinds of proposals frame ICTs as more than already-existing artefacts: they are seen as sociotechnical ensembles (Bijker, 1993); an analytical approach that expands the focus beyond physical technology to also consider the broader social context of how an artefact is shaped, distributed, adopted, and used. A 2010 World Bank report applies this kind of perspective to broadband, defining it as an "interconnected, multilayered ecosystem" that includes networks, services, applications, and users (Kim, Kelly & Raja, 2010, p.15). Viewed this way, broadband development policy takes on a broader focus than simple diffusion:

> [B]uilding a high-speed telecommunications network is only the necessary first step in developing a broadband system. A range of policies and programs are needed to promote and universalize the use of this network by supporting the development of services and applications, encouraging users to go online, and taking steps towards wider inclusiveness. (Kim et al, 2010, p.17)

In Canada, proposals have emerged to support this more holistic approach to broadband development. For example, proponents of Community Informatics argue that communities be supported to take ownership of the design and administration of broadband systems (Gurstein, 2000; 2007). Gurstein (2007) highlights the need to design socio-technical systems that support community-based participation and control, for example through mechanisms of decentralized local governance. This perspective considers "the design of the social system in which the technology is embedded as well as the technology system in which it interacts" (Gurstein, 2000, p.2). Another proposal from this perspective is Clement and Shade's (2000) *Access Rainbow*, which includes questions about levels of digital literacy and governance alongside broadband penetration statistics. These kinds of proposals are acknowledged by Canada's federal government in numerous policy documents (see for example the CRTC, 2009; National Broadband Task Force, 2001). They also share parallels with Canada's long history of development of large-scale communication infrastructures for telephony and satellite television. The historical development of these infrastructures received government support through subsidies and regulation, as shaped with reference to the public benefits their diffusion and use among residents could support (Babe, 1990; Raboy & Shtern, 2010, p.75).

At present, broad areas of Canada still lack a robust broadband infrastructure (Fiser, 2010; O'Donnell et al, 2010; White et al, 2010). Given their remote and expensive-to-serve locations, rural and remote regions remain unattractive targets for profit-oriented telecommunications companies, due to high infrastructure development costs and lower levels of potential profits (McIver, 2010, p.156; see also CRTC, 2009; Wilson, 2008). Evidence also highlights pricing mechanisms and infrastructure costs as

a primary source of this digital divide between urban and rural First Nations communities in Canada. For example, in 2009-10, Fiser found an average household subscriber in the 537 First Nations census subdivisions he examined pays more and receives less access to broadband, compared to residents in the urban south (Fiser, 2010, p. 35). In 2007, Fraser found that costs to access broadband in Nunavik and Nunavut can be three to five times higher than in southern urban centres -- with download capacity only a fraction of what is available in the South (Fraser, 2007).

Policy contexts are never static, and given the continuing need to address these ongoing digital divides among First Nations communities in Canada, there may be an opportunity to introduce a new policy framework that recognizes the unique needs of these communities. In recent years, critics point to an uneven application in federal policy of the holistic considerations noted above. For example, Shade (2010) writes that over the last decade, ICT policy has shifted "toward a discourse that merely advantages consumers' access to goods and services" (p.122). Raboy and Shtern (2010) similarly question whether twenty years of government policies to 'connect Canadians' will culminate in simply improving technology penetration statistics (p.76). They offer the example of $225 million pledged in the 2009 federal budget through the Broadband Canada: Connecting Rural Canadians Program (Industry Canada, 2010). They argue that even as this new funding was released, the federal government was simultaneously reducing the budgets of longstanding (and positively evaluated) community connectivity programs like SchoolNet and the Community Access Program (Raboy & Shtern, 2010; see also Moll, 2011).

For rural and remote First Nations, these policy challenges, and efforts to address them, must be accompanied with specific considerations that relate to their unique status as self-governing Aboriginal nations (Alexander, 2009; Fiser & Seibel, 2009; McMahon et al, 2010). First Nations have long argued that centralized government programs and policies preclude the efforts of their own Aboriginal governments to secure self-determination. Such actions on the part of the federal government appear in several cases of broadband development policy. For example, in 2009-10, formal consultations accompanying the federal government's announcements to develop a national digital strategy did not refer to the specific contexts of on- and off-reserve First Nations, Inuit, and Métis communities -- despite recommendations to do so provided through past government-funded programs such as the Aboriginal Canada Portal (Alexander, 2005).

During interviews for the recently published (December, 2010) report *Putting the 'last-mile' First*, representatives from a broad sample of First Nations regional technology organizations across Canada consistently spoke about their lack of involvement in and problems with federal broadband development policy-making (McMahon et al, 2010; see also O'Donnell et al, 2010). Some of these informants described how public investments in corporate and private infrastructure often leave First Nations communities without equitable and affordable services and long-term, sustainable broadband solutions. Such arguments echo public calls for more substantive First Nations involvement in broadband development put forward by political groups like the national Assembly of First Nations (J. Whiteduck, 2010; Whiteduck, Burton, Whiteduck, & Beaton, 2010), and by academic researchers working in this area (Fiser, 2010; Fiser, & Siebel, 2009; McMahon, 2011; Mignone & Henley, 2009; O'Donnell et al, 2010). For example, in 2010 the Assembly of First Nations outlined a strategy for a national, community-based First Nations broadband network called the "e-Community ICT model" (J. Whiteduck, 2010) but at time of publication this proposed network remains unfunded by the federal government.

The next section of this paper outlines an alternative approach to connectivity policy-making articulated in the late 1990s called the 'First Mile'. We suggest this 'First Mile' policy framework is useful for the specific context of First Nations broadband development in Canada, and potentially for other Indigenous peoples. The First Mile approach shares many of the same considerations as Community Informatics and the *Access Rainbow*, and in particular foregrounds that broadband development must

emerge from, and be shaped to fit, local community contexts. However, we suggest the First Mile approach has particular resonance for Indigenous peoples. During the World Summit on the Information Society (2003 to 2005), Indigenous peoples highlighted the need to balance equitable access to information and communications technologies with the need to retain their unique, locally grounded Indigenous rights, cultural identities, traditional territories and resources. Participants noted that Indigenous peoples themselves are best positioned to decide when and how they access and use new technologies such as broadband systems (Aboriginal Canada Portal, 2005).

This position echoes other aspects of Indigenous policy development, for example the principles of ownership, control, access and possession, or OCAP, initially developed for the purposes of Aboriginal health research in Canada (Schnarch, 2004). Furthermore, it is reflected in many examples of local Indigenous communities around the world working to secure local control and ownership of broadband systems, including the projects in Canada described earlier in this paper, and in regional projects like the Outback Digital Network and the Tanami Network in Australia (Landzelius, 2006, p.6; see also Hartley, 2004; Latukefu, 2006; Leclair & Warren, 2007). As Ginsberg (1995) writes, the satellite-based Tanami Network connects four Aboriginal communities in such a way that "local areas are the centre from which information emanates, a reversal of the European model that sees the urban cities as the center and the remote communities as the periphery" (Ginsberg, 1995, p.131; see also Meadows, 1995). Some researchers suggest this approach to network development has implications for policy-making in other areas. As Latukefu writes:

> Governments in Australia have tried to fashion a response to Indigenous issues largely by creating structures which best suited the federated units that emerged out of the colonial system. Needless to say, these characteristically have not reflected Indigenous forms of governance or their power structures, nor have they recognized the diversity of cultures, languages and societies that make up what is monolithically regarded as 'Aboriginal Australia.' (Latukefu, 2006, p.51)

In the Canadian context, some First Nations are similarly working to ensure broadband systems are guided by development policies that recognize their unique status as self-governing, sovereign nations. In this context, we suggest they are asserting their self-determination in the context of broadband development: an effort captured in the policy framework of the 'First Mile'.

Bringing Back the First Mile

First Mile approaches are still in the minority among the hundreds of remote and rural First Nations across Canada; many and probably most First Nations are struggling to develop and use broadband networks effectively in "last-mile" development contexts. As already mentioned, research on First Mile initiatives in First Nations is at its earliest stages. Much more community-based investigation will be necessary to fully explore these initiatives. At this early stage, however, we believe that the First Mile offers a solid and very promising alternative to traditional policy approaches to addressing the digital divide in First Nations.

In the late 1990s, a group of rural telecommunications technicians, communication for development practitioners, university-based researchers, community-based connectivity professionals and policy-makers formulated the concept of 'First Mile' connectivity (Paisley & Richardson, 1998). Drawing on historical models, such as the American rural telephone development cooperatives of the early 20th century (Garcia & Gorenflow, 1998), the First Mile project examined the decision-making processes used in rural telecommunications infrastructure development. Employing a 'communication

for development' approach, proponents argued that policy-making can be articulated and supported through the participatory use of media technologies like film (Snowden, 1998), radio and video (Norrish, 1998), and the Internet (Moetsabi, 1998; Richardson, 1998b), and in public forums held in 'multipurpose community telecentres' (Ernberg, 1998). These media technologies would be used by local community members to express ideas and requirements to policy-makers charged with developing connectivity infrastructures. As McConnell writes:

> The focus of ICT research is currently fixated on the institutional level, which is composed of Internet Service Providers (ISPs), policy makers and governments. While the value of such research is not challenged here, the fact remains that very little investigation has been conducted concerning the impacts of ICT on those who have the most to gain through the expansion of ICT in the developing world: the stakeholder communities. (McConnell, 1998, para 2)

By framing the connectivity policy-making process this way, the First Mile project sought to highlight ways that user communities, rather than centralized governments or service providers, can drive development. Local community members would ideally control and administer the resulting connectivity infrastructure, which was seen as offering little value unless it directly and substantively benefitted user communities. This perspective aligns with Community Informatics, which insists that technology in itself will not support community development unless it supports collaboratively-identified goals. Both approaches involve an increased role for local leadership, planning, design, training, and supporting structures (Gurstein, 2003). As Garcia and Gorenflow write about the First Mile approach: "if networking technologies are to promote development, deployment strategies must be integrated with complementary social and economic policies" (Garcia & Gorenflow, 1998, para 4).

The First Mile approach sought to address the formation of long-term dependency relationships on external providers of connectivity services. Richardson (1998a) argued that "the biggest drawbacks of rural telecommunication systems are dependency on largely urban-centred telecommunication regulations and legislation" (para 26). The First Mile sought to redistribute power and control of these systems to and in local communities. Some proponents argued this increased local control might encourage take-up of technologies among community members (Dymond, 1998). By encouraging community members to articulate how and why they will use newly available technologies before these tools are put in place, proponents theorized that ICTs are more likely to be recognized as valuable to community users.

In order to engage community members, the First Mile required appropriate communication platforms they could use (Richardson and Rajasunderam, 1998). Interactions between community members and decision-makers would be facilitated by media technologies like video or radio (Anyaegbunam, Mefalopulos & Moetsabi, 1998; Norrish, 1998). The goals of this communications process included articulating specific needs and counteracting biases on the part of urban-located decision-makers tasked with developing connectivity policy (Anyaegbunam et al, 1998; Ernberg, 1998; Ramirez, 1998). For example, as Paisley and Richardson (1998) write:

> The concept of the 'last-mile' carries a lot of negative connotations and compels us to assume the perspective of an urbanite looking down at the rural margins…[T]he 'first mile of connectivity'…expresses a more equitable and far less urban-centric view of the challenge of providing everyone with the option of connecting themselves to the rest of the world and all it has to offer (para 1).

In short, the First Mile project in the 1990s argued the process of connectivity development in local communities must be fundamentally re-framed to support and encourage participation of community members in all stages of planning, implementation and use. It argued that the most effective, efficient connectivity designs and applications are those rooted in the specific requirements of local communities. To address the challenges of power discrepancies, differing cultural worldviews, and potential dependency on external service providers, the First Mile process sought to re-distribute decision-making power to community members, supported through interactive media technologies.

Links between the First Mile and First Nations Political Autonomy

We suggest that a First Mile policy approach in Canada might support First Nations leadership to make decisions about broadband development for and in their communities. This approach recognizes specific differences between First Nations communities and non-Aboriginal communities in Canada. First Nations are self-governing autonomous political entities, with each First Nation responsible for providing political, social, economic, community and cultural services to its members and residents. These responsibilities are different from those of municipal governments: they are grounded in the legal and political status of First Nations as sovereign peoples with political treaty relationships with the federal government and with inherent, group differentiated rights. It is important to note the variety of interpretations and applications of self-determination and self-government by First Nations (Abele, 1999; Abele & Prince, 2006; Macguire, 2008; Tully, 1999). This paper avoids commenting on the form of self-determination that individual First Nations express. However, it does recognize these political considerations are central to efforts of First Nations to secure control over broadband development. This is one reason we suggest that examples of First Mile broadband development are best examined on a case-by-case basis.

While group-differentiated Aboriginal rights are enshrined in formal documents, including section 35 of the *Canadian Constitution* (1982), there is a long history and ongoing denial of these rights by the institutions of the Canadian state (Jenson, 1999; Tully, 1999). There is also a lack of clarity around the scope of these rights, and the opportunities First Nations have to exercise them in practice (Abele, 1999; Culhane, 1998, p.41; McMillan & Yellowhorn, 2004). These challenges impact the ability of First Nations to secure control over policy development and service delivery. They are reflected in ongoing funding constraints, fragmented government policies, and a policy development process typically developed in centralized, urban institutional environments. Compounding these challenges, many First Nations communities have small populations and are relatively geographically isolated, with some only accessible year-round through fly-in access. Many lack roads or other infrastructure, including for broadband. We suggest that these conditions, as well as the ongoing digital divide these First Nations communities face, support arguments that broadband development policies involving Canada's First Nations must be fundamentally transformed. Drawing on the 'First Mile', we argue this transformation must support policy-making grounded in and emerging from First Nations communities themselves.

As noted earlier, First Nations organizations, including the Assembly of First Nations (J. Whiteduck, 2010; Whiteduck, Burton, Whiteduck, & Beaton, 2010) and the various regional IT organizations interviewed for the *Putting the Last-Mile First* report (McMahon et al, 2010), have long advocated more involvement in broadband development. In many cases, their arguments are framed around their perception of a disjoint between the needs and processes employed by urban-located public and private sector institutions, and those of the various First Nations. First Nations argue that centralized government programs and policies created in isolation from the communities they are intended to serve preclude rather than support efforts to address the digital divide their communities face. Furthermore, they argue broadband development policy should support principles developed and

DOI: 10.18584/iipj.2011.2.2.2

employed by Aboriginal governments in Canada in other areas of government policy, such as the principles of ownership, control, access and possession (OCAP) (Schnarch, 2004, see O'Donnell et. al, 2011).

Conclusion

First Nations communities presently face challenges of connectivity similar to those described in the *First Mile* project of the late 1990s. In policy development, rural and remote First Nations are historically framed as the last mile of connectivity to be serviced by external providers (McMahon et al, 2010). Yet at the same time, First Nations in Canada are engaging in a broad variety of community-driven broadband development projects. There are many concrete examples of Canada's rural and remote First Nations communities shaping and using broadband systems to meet their unique, local requirements -- a process described and supported through years of research and on-the-ground work (Fiser & Seibel, 2009; Mignone & Henley, 2009; O'Donnell et al, 2010). We argue that these projects offer concrete examples of *First Mile* broadband and connectivity development in action.

It is important to note that the First Mile approach should not be uncritically accepted as a panacea to broadband development policy. Internally, one major challenge these communities face in achieving First Mile broadband systems is a lack of human and technical resources. It is not enough for a community to simply build local broadband infrastructure; many remote and rural First Nations communities lack the capacity to manage them. For example, some satellite-served remote communities must employ technically sophisticated bandwidth management strategies to accommodate their needs, but sometimes lack human and technical resources and expertise needed to operate them effectively (O'Donnell, Simms, Walmark & Hancock, 2009). In terms of usage of these systems, there are often low levels of awareness among First Nations community members that broadband technologies are available and useful. For example, even 10 years after introducing videoconferencing equipment, in some communities people do not integrate this technology in their daily work. This is often due to a lack of basic training, high levels of staff turnover, and the lack of community engagement skills.

Externally, First Nations control and ownership of broadband systems is impacted by the uncertain nature of federal government funding programs (McMahon et al, 2010). While government funds for public services in First Nations are guaranteed due to treaty relationships, levels of funding are often insufficient and not administered by the federal government in a manner that meets community needs. A trend over the past two decades indicates that the federal government has been converting program funding in government departments to short-term project and one-time capital funding, and therefore many social and community services lack stability (Gibson, O'Donnell, & Rideout, 2007). The federal government continues to reduce funding for technology initiatives, and in 2011 cut the First Nations SchoolNet program despite positive outcomes and an excellent evaluation from its sponsoring agency (Indian and Northern Affairs Canada, 2009). Conversely, the government provides funding directly to commercial telecommunications companies to develop broadband infrastructure in rural and remote First Nations, instead of giving it to First Nations to develop it themselves (O'Donnell, Kakekaspan, Beaton, Walmark & Gibson, 2011).

Despite these challenges to its implementation, we suggest the First Mile policy framework offers an opportunity for First Nations in Canada to secure self-determination in broadband development. Following Macguire's (2008) argument that self-determination is most effectively articulated by the parties engaging in it, our tentative suggestion is that the First Mile projects underway in Canada offer examples of self-determination in action. There are many historical and contemporary

examples of how Indigenous peoples around the world have struggled for greater self-determination in a variety of fields, including contemporary social movements taking place through the networks made possible through digital technologies and the Internet. We suggest that a First Mile approach offers a policy framework that supports First Nations control and ownership of community-driven broadband development. The specific forms that First Mile projects take are grounded in local communities (and/or partnerships between communities) and contingent on local contexts (Thiessen & Looker, 2008). As noted several times in this paper, in-depth research of First Mile projects is at its very earliest stages. In future, as more studies with these community projects are completed, they will showcase how First Nations are planning, administering, managing and retaining ownership of the digital networks and technologies that deliver public and community services. Grouped under the paradigm of the 'First Mile', we propose that these projects hold potential and relevance in the international context of Indigenous self-determination in broadband development.

DOI: 10.18584/iipj.2011.2.2.2

References

Abele, F. (1999). The importance of consent: Indigenous peoples' politics in Canada. In J. Bickerton, & A. G. Gagnon (Eds.), *Canadian politics* (3 ed., pp. 443-462). Peterborough: Broadview Press, Ltd.

Abele, F. & Prince, M. J. (2006). Four pathways to Aboriginal self-government in Canada. *American Review of Canadian Studies*, *36*(4), 568-595.

Alexander, C. J. (2001). Wiring the Nation! Including First Nations? Aboriginal Canadians and the federal e-government initiatives. *Journal of Canadian Studies*, *35*(4), 277-296.

Alexander, C. J. (2005). Northern exposure: Assessing citizenship, democracy and the great Canadian e-government expedition. *Technikfolgenabschatzung: Theorie und Praxis, 2*(14), 80-87.

Alexander, C. J., Adamson, A., Daborn, G., Houston, J., & Tootoo, V. (2009). Inuit cyberspace: The struggle for access for Inuit Qaujimajatuqangit. *Journal of Canadian Studies*, *43*(2), 220-249.

Anyaegbunam, C., Mefalopulos, P., & Moetsabi, T. (1998). Participatory rural communication appraisal methodology (PRCA): The application of participatory approaches to communication programme design and implementation for sustainable human development. In L. Paisley, & D. Richardson (Eds.), *The First Mile of connectivity: Advancing telecommunications for rural development through a participatory communication approach.* Communication for Development Rome: Food and Agriculture Organization of the United Nations (FAO). Retrieved from: http://www.fao.org/docrep/x0295e/x0295e07.htm

Babe, R. E. (1990). *Telecommunications in Canada: Technology, industry and government*. Toronto: University of Toronto Press.

Beaton, B., Fiddler, J., & Rowlandson, J. (2004). Living smart in two worlds: Maintaining and protecting First Nation culture for future generations. In M. Moll, & L. R. Shade (Eds.), *Seeking convergence in policy and practice: Communications in the public interest* (Vol. 2, pp.283-297). Ottawa: Canadian Centre for Policy Alternatives.

Carpenter, P., & Kakepetum-Schultz, T. (2010, May). *Above and beyond: Embedding community values and beliefs into an evolving First Nations IT health system.* E-Health COACH Conference, Vancouver.

Clement, A., & Shade, L. (2000). The Access Rainbow: Conceptualizing universal access to information /communications infrastructure. In M. Gurstein (Ed.), *Community informatics: Enabling communities with information and communication technologies* (pp. 32-51). Hershey: Idea Pub.

Canadian Radio-Television and Telecommunications Commission. (2010). *Navigating convergence: Charting Canadian communications change and regulatory implications*. Convergence Policy, Policy Development and Research. Retrieved from: http://www.crtc.gc.ca/eng/publications/reports/rp1002.htm

Culhane, D. (1998). *The pleasure of the crown: Anthropology, law and First Nations.* Burnaby: Talon Books, Ltd.

Dymond, A. (1998). Public and private interests in achieving viable rural service: The role of a favourable policy environment. In L. Paisley, & D. Richardson (Eds.), *The First Mile of connectivity: Advancing telecommunications for rural development through a participatory communication approach.* Communication for Development Rome: Food and Agriculture Organization of the United Nations (FAO). Retrieved http://www.fao.org/docrep/x0295e/x0295e22.htm

Ernberg, J. (1998). Empowering communities in the information society: An international perspective. In L. Paisley, & D. Richardson (Eds.), *The First Mile of connectivity: Advancing telecommunications for rural development through a participatory communication approach.* Communication for Development Rome: Food and Agriculture Organization of the United Nations (FAO). Retrieved from: http://www.fao.org/docrep/x0295e/x0295e15.htm

Fiddler, J. (2008, February). *UN Declaration on the Rights of Indigenous Peoples: The role of ICTs.* Presentation at the First Nations ICT Summit. Vancouver.

Fiser, A. (2010). A map of broadband deployment in Canada's Indigenous and Northern communities: Access, management models, and digital divides (circa 2009). *Communication, Politics & Culture*, *43*(1), 7-47.

Fiser, A., & Seibel, F. (2009, March). *From national technology experiment to regional socio-economic development: Policy measurement, social enterprise, and the demands of Aboriginal community networking beyond the Connecting Canadians agenda.* Aboriginal Policy Research Conference: Ottawa.

Garcia, L. D., & Gorenflo, N. R. (1998). Rural networking cooperatives: Lessons for international development aid strategies. In L. Paisley, & D. Richardson (Eds.), *The First Mile of connectivity: Advancing telecommunications for rural development through a participatory communication approach.* Communication for Development Rome: Food and Agriculture Organization of the United Nations (FAO). Retrieved from: http://www.fao.org/docrep/x0295e/x0295e21.htm

Gibson, K., O'Donnell, S., & Rideout, V. (2007). The project funding regime: Complications for community organizations and their staff. *Canadian Public Administration Journal*, *50*(3), 411-436.

Gurstein, M. (2000). *Community informatics: Enabling communities with information and communications technologies.* Hershey: Idea Group Publishing.

Gurstein, M. (2007). *What is community informatics? (And why does it matter?).* Milan: Polimetrica. Retrieved from: http://eprints.rclis.org/12372/1/WHAT_IS_COMMUNITY_INFORMATICS_reading.pdf

Gurstein, M., Beaton, B., & Sherlock, K. (2009). A community informatics model for e-Services in First Nations communities: The K-Net approach to water treatment in Northern Ontario. *Journal of Community Informatics*, *5*(2). Retrieved from: http://ci-journal.net/index.php/ciej/article/view/383

Hancock, B. R., & O'Donnell, S. (2009, May). *New media and self-determination: Publicly made and accessible video and remote and rural First Nation communities.* Canadian Communication Association Annual Conference, Ottawa.

Howard, P. N., Busch, L., & Sheets, P. (2010). Comparing digital divides: Internet access and social inequality in Canada and the United States. *Canadian Journal of Communication*, *35*(1), 109-128.

Industry Canada. (2010, November 6). *Government of Canada announces third round of Broadband Canada funding: Approximately 30,000 more households to benefit from broadband internet access* [Press Release]. Retrieved from: http://media.knet.ca/node/10815

Jenson, J. (1999). Understanding politics: Concepts of identity in political science. In J. Bickerton, & A. G. Gagnon (Eds.), *Canadian politics* (3 ed., pp. 39-56). Peterborough: Broadview Press, Ltd.

Leclair, C., & Warren, S. (2007). Portals and potlach. In L. E. Dyson, M. Hendriks, & S. Grant (Eds.)*, Information technology and Indigenous people* (pp. 1-13). Hershey: Information Science Publishing.

Macguire, A. (2008). Law protecting rights: Restoring the law of self-determination in the neo-colonial world. *Law, Text, Culture*, *12*(1), 12-39.

Matear, M. (2002). Canada must make broadband infrastructure a priority. *Canadian Journal of Communication*, *27*(4), 461-467.

Mattlelart, A. (2000). *Networking the world, 1794-2000*. Minneapolis and London: University of Minnesota Press.

McConnell, S. (1998). Connecting with the unconnected: Proposing an evaluation of the impacts of the Internet on unconnected rural stakeholders. In L. Paisley, & D. Richardson (Eds.), *The First Mile of connectivity: Advancing telecommunications for rural development through a participatory communication approach.* Communication for Development Rome: Food and Agriculture Organization of the United Nations (FAO). Retrieved http://www.fao.org/docrep/x0295e/x0295e19.htm

McIver, W. J. (2010). Internet. In M. Raboy, & J. Shtern (Eds.), *Media divides: Communication rights and the right to communicate in Canada* (pp. 145-174). Vancouver and Toronto: UBC Press.

McMahon, R. (2011). The institutional development of Indigenous broadband infrastructure in Canada and the U.S.: Two paths to 'digital self determination'. *Canadian Journal of Communication*, *35*(3), 115-140.

McMahon, R., O'Donnell, S., Smith, R., Woodman Simmonds, J., & Walmark, B. (2010). *Putting the 'last-mile' first: Re-framing broadband development in First Nations and Inuit communities.* Vancouver: Centre for Policy Research on Science and Technology (CPROST). Retrieved March 9, 2011 from: http://www.firstmile.ca

McMillan, A. D., & Yellowhorn, E. (2004). Aboriginal people and Canada: Emerging relations. In A. D. McMillan, & E. Yellowhorn, *First Peoples in Canada* (pp.315-336). Vancouver and Toronto: Douglas & McIntyre.

Middleton, C. (2010, October). *From Canada 2.0 to a digital nation.* Canadian Federation for the Humanities and Social Sciences, Big Thinking lecture, Ottawa. Retrieved from: http://www.fedcan.ca/content/en/618/From_Canada_2.0_to_a_Digital_Nation.html

Mignone, J. & Henley, H. (2009). Impact of information and communication technology on social capital in Aboriginal communities in Canada. *Journal of Information, Information Technology, and Organizations*, *4*, 127-145.

Moetsabi, T. (1998). Participatory approaches for promoting rural connectivity: An exploration of issues. In L. Paisley, & D. Richardson (Eds.), *The First Mile of connectivity: Advancing telecommunications for rural development through a participatory communication approach.* Communication for Development Rome: Food and Agriculture Organization of the United Nations (FAO). Retrieved from: http://www.fao.org/docrep/x0295e/x0295e14.htm

Moll, M. (2011). A brief history of the Community Access Program: From community economic development to social cohesion to digital divide. In A. Clement, M. Gurstein, G. Longford, M. Moll, & L. Shade (Eds.), *Connecting Canadians: Investigations in community informatics.* Edmonton: University of Athabasca Press.

Morris, T. L., & Meinrath, S. D. (2009). *New media, technology and internet use in Indian Country: Quantitative and qualitative analyses*. Washington, D.C: Native Public Media and New America Foundation: Open Technology Initiative. Retrieved from: http://homahotaconsulting.com/Documents/NPM-NAF%20New%20Media%20Study%202009%20%28small%29.pdf

National Broadband Task Force. (2001). *The new national dream: Networking the nation for broadband access*. Industry Canada: Ottawa. Retrieved from: http://dsp-psd.pwgsc.gc.ca/Collection/C2-574-2001E.pdf

National C-Band Benefit User Group. (2005). *Indigenous community leaders from the north in three provinces to attend opening of satellite broadband network in Sioux Lookout, Ontario* [Press Release]. Retrieved from: http://smart.knet.ca/satellite/press_release.html

Norris, P. (2001). *Digital divide: Civic engagement, information poverty and the Internet worldwide*. Cambridge: Cambridge University Press.

Norrish, P. (1998). Radio and video for development. In L. Paisley, & D. Richardson (Eds.), *The First Mile of connectivity: Advancing telecommunications for rural development through a participatory communication approach.* Communication for Development Rome: Food and Agriculture Organization of the United Nations (FAO). Retrieved from: http://www.fao.org/docrep/x0295e/x0295e08.htm

O'Donnell, S., Kakekaspan, M., Beaton, B., Walmark, B., & Gibson, K. (2011, September). *How the Washaho Cree Nation at Fort Severn is using a "First Mile Approach" to deliver community services.* Paper presented at the Telecommunications Policy Research Conference, Arlington, Virginia, USA.

O'Donnell, S., Kakekaspan, G., Beaton, B., Walmark, B., Mason, R., & Mak, M. (2011, forthcoming) A new remote community-owned wireless communication service: Fort Severn First Nation builds their local cellular system with Keewaytinook Mobile. *Canadian Journal of Communication*.

O'Donnell, S., Milliken, M., Chong, C., & Walmark, B. (2010, June 1-3). Information and communication technologies (ICT) and remote and rural First Nations communities: An overview. *Canadian Communication Association Annual Conference*, Montreal.

O'Donnell, S., Perley, S., Simms, D., & Hancock, B-R. (2009). Video communication roadblocks facing remote Indigenous communities. *IEEE Technology & Society Magazine, 28*(2), 16-22.

O'Donnell, S., Perley, S., Walmark, B., Burton, K., Beaton, B., & Sark, A. (2009). Community-based broadband organizations and video communications for remote and rural First Nations in Canada. In L. Stillman, G. Johanson, & R. French (Eds.), *Communities in action* (pp. 107-119). Newcastle upon Tyne, UK: Cambridge Scholars Publishing.

Paisley, L., & Richardson, D. (1998). Why the *first* mile and not the last? In L. Paisley, & D. Richardson (Eds.), *The First Mile of connectivity: Advancing telecommunications for rural development through a participatory communication approach.* Communication for Development Rome: Food and Agriculture Organization of the United Nations (FAO). Retrieved from: http://www.fao.org/docrep/x0295e/x0295e03.htm

Raboy, M., & Shtern, J. (2010). *Media divides: Communication rights and the right to communicate in Canada*: Vancouver: UBC Press.

Ramirez, R. (1998). Communication: A meeting ground for sustainable development. In L. Paisley, & D. Richardson (Eds.), *The First Mile of connectivity: Advancing telecommunications for rural development through a participatory communication approach.* Communication for Development Rome: Food and Agriculture Organization of the United Nations (FAO). Retrieved from: http://www.fao.org/docrep/x0295e/x0295e05.htm

Ramirez, R. (2001). A model for rural and remote information and communication technologies: A Canadian exploration. *Telecommunications Policy*, *25*(5), 315-330.

Ramirez, R. (2007). Appreciating the contribution of broadband ICT with rural and remote communities: Stepping stones towards an alternative paradigm. *The Information Society*, *23*(2), 85-94.

Richardson, D. (1998a). Rural telecommunication services and stakeholder participation: Bridging the gap between telecommunication experts and communication for development practitioners. In L. Paisley, & D. Richardson (Eds.), *The First Mile of connectivity: Advancing telecommunications for rural development through a participatory communication approach.* Communication for Development Rome: Food and Agriculture Organization of the United Nations (FAO). Retrieved from: http://www.fao.org/docrep/x0295e/x0295e04.htm

Richardson, D. (1998b). The Internet and rural development. In L. Paisley, & D. Richardson (Eds.), *The First Mile of connectivity: Advancing telecommunications for rural development through a participatory communication approach.* Communication for Development Rome: Food and Agriculture Organization of the United Nations (FAO). Retrieved from: http://www.fao.org/docrep/x0295e/x0295e13.htm

Richardson, D., & Rajasunderam, C. V. (1998). Training community animators as participatory communication for development practitioners. In L. Paisley, & D. Richardson (Eds.), *The First Mile of connectivity: Advancing telecommunications for rural development through a participatory communication approach.* Communication for Development Rome: Food and Agriculture Organization of the United Nations (FAO). Retrieved from: http://www.fao.org/docrep/x0295e/x0295e17.htm

Sandvig, C. (2012, forthcoming). Connection at Ewiiaapaayp Mountain: Indigenous internet infrastructure. In: L. Nakamura, & P. Chow-White (Eds.), *Race after the internet*. New York: Routledge.

Schiller, D. (2007). *How to think about information*. Urbana and Chicago: University of Illinois Press.

Shade, L. R. (2010). Access. In M. Raboy, & J. Shtern (Eds.), *Media divides: Communication rights and the right to communicate in Canada* (pp. 120-144). Vancouver and Toronto: UBC Press.

Snowden, D. (1998). Eyes see; Ears hear. In L. Paisley, & D. Richardson (Eds.), *The First Mile of connectivity: Advancing telecommunications for rural development through a participatory communication approach.* Communication for Development Rome: Food and Agriculture Organization of the United Nations (FAO). Retrieved from: http://www.fao.org/docrep/x0295e/x0295e06.htm

Thiessen, V. & Looker, E. D. (2008). Cultural centrality and information and communication technology among Canadian youth. *Canadian Journal of Sociology*, *33*(2), 311-336.

Tully, J. (1999). Aboriginal peoples: Negotiating reconciliation. In J. Bickerton, & A. G. Gagnon (Eds.), *Canadian politics* (3 ed., pp. 413-442). Peterborough: Broadview Press, Ltd.

Unwin, T. (2009). *Information and communication technologies for development ICT4D: Information and communication technologies for development.* Cambridge: Cambridge University Press.

Walmark, B., O'Donnell, S., & Beaton, B. (2005, August 24-16). Research on ICT with Aboriginal communities: Report from RICTA 2005. *Community informatics research network conference*, Cape Town, South Africa.

White, J. P., Peters, J., Beavon, D., & Dinsdale, P. (2010). *Aboriginal policy research VI: Learning, technology and traditions*. Toronto: Thompson Educational Publishing.

Whiteduck, J. (2010). Building the First Nation e-community. In J. P. White, J. Peters, D. Beavon, & P. Dinsdale (Eds.), *Aboriginal policy research VI: Learning, technology and traditions* (pp. 95-103). Toronto: Thompson Educational Publishing.

Whiteduck, T. (2010). First Nations SchoolNet and the migration of broadband and community-based ICT applications. In J. P. White, J. Peters, D. Beavon, & P. Dinsdale (Eds.), *Aboriginal policy research VI: Learning, technology and traditions* (pp. 105-117). Toronto: Thompson Educational Publishing.

Whiteduck, J., Burton, K., Whiteduck, T., & Beaton, B. (2010). *A First Nations perspective on a digital economy strategy and an Aboriginal connectivity strategy*. Consultation Paper, submitted to Industry Canada's Digital Economy Strategy consultation and to Indian and Northern Affairs Canada. Retrieved March 9, 2011 from: http://de-en.gc.ca/wp-content/themes/clf3/upload/1938/Aboriginal-Connectivity-AFN-First-Nation-Submission.pdf

Wilson, K. G. (2008). The last mile: Service tiers versus infrastructure development and the debate on Internet neutrality. *Canadian Journal of Communication*, *33*(1), 81-100.