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Reducing the Digital Divide in Rural Manitoba: A Proposed Framework

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Abstract

Outside of larger centres across Canada public policies and corporate investments have left 2 million rural households under-served with broadband network capacity. After nearly 20 years of activities this gap may be closing, yet front line strategists suggest our rural digital divide will persist for years to come. A supplemental to the current approach is needed to connect these rural areas, yet it may require different technologies and social capital investment. This paper brings the reader inside a Manitoba working group (Forum) to reveal how applied research, assisted in formulating an integrated action framework that proposes an approach to provide access to users and expand the uses of broadband while calling for leadership and utilizing social marketing. New partnerships are envisioned across three levels of public sector, ISPs, and local businesses, along with youth and citizens. A proposed implementation framework is offered as an approach to incrementally provide specific rural broadband services to one area before moving to the next. This framework is not a silver bullet for all rural areas, but rather offers an approach that might be a useful starting point for under-served rural areas in Canada.

Keywords: Rural broadband, under-served communities, access, availability, partnerships, integrated approach, implementation

1.0 Introduction

Current investments and activities of government and businesses are leaving behind under-served rural communities regarding broadband services. Government investments have contributed to expanding broadband network infrastructure and spurred existing ISPs and created new ones to bring broadband services and related training to areas outside of urban centres. ISP businesses have expanded their service into nearby regional catchment areas. Yet there remain un-serviced rural areas affecting local businesses, agricultural producers, and residents, along with hampering their potential for growth and limiting access to e-government services. The government approach of treating rural areas with the same undifferentiated

policy seems to be part of the problem. The technology that delivers bundled services offered by ISPs into rural areas continues to bypass under-served communities. When taken together, this challenge calls for a different or supplemental approach that deliberately addresses the unique character of each of these under-served rural areas. This paper brings forward a model that responds to the under-served rural communities with an integrated strategic implementation approach. The framework reflects community-based or rural development approaches where collaboration, partnerships, inclusion, and sustainability guide its formulation. This paper begins with describing the context of rural broadband and is followed by an explanation of the case study method, based on activities of a working group of senior government officials in Manitoba. Key challenges of rural broadband are described and an action-oriented implementation framework is detailed as an important response. The paper concludes by noting implications of this broadband framework to other rural areas in Canada, along with describing further research.

2.0 Rural Broadband in context

Across Canada the information highway is embedded in everyday lives in cities and rural communities. Yet as early as the 1990s, NTIA (1995) and others (Parker, 2000; Tapscott, 1997) brought attention to a growing digital divide between urban and rural locations. As reported by NBTF (2001) and CRTC (2010a), nearly all large urban areas have 100% coverage of broadband (1.5 Mbps), and this same broadband connectivity trend held promise for rural areas. In the last decade governments invested upwards of $3.27 Billion in connecting households, providing cell phone coverage, cable TV, and Internet or broadband. Some of the recent $225 Million Federal funding for broadband created new service providers with a focus on under-served communities, including NetSet (Toderash, 2012) and Broadband Communications North – BCN (Ramchandar, 2012). As recently as April 2012, the federal government Minister Bernier reconfirmed the importance of broadband connectivity to small and medium businesses and rural economies from coast to coast to coast (Bernier, 2012). In June 2012, the Prime Minister of Canada announced a $5.8 Million investment to connect as many as 83 First Nation health centres in Saskatchewan (Health Canada, 2012). The Information and Communication Technology (ICT) sector has also been investing as they continue to install costly upgrades and expand their systems. Recently, the president of Manitoba Telephone System (MTS) stated, at a national rural policy conference in Brandon Manitoba, its investment strategy of $15 Million aimed at connecting upwards of two-dozen rural communities (Shepherd, 2010). New businesses are also active and bringing innovative solutions to rural areas, including Xplornet, a 2004 start-up ISP from New Brunswick that continues to bring satellite and fixed wireless coverage while finding new opportunities with broadband for rural areas across Canada (Macdonald, 2012). In addition to these investments, public sector agencies with large or heavy data requirements for broadband, for example in Manitoba, including hospital and medical imagery, security for live proceedings involving judicial systems, and others such as lottery corporations, are making known their rural broadband demands too. To meet such public sector data demands, multi-year procurement agreements with large ISPs already exist, as in the case with the Manitoba Government with MTS. Having said this, the supply of broadband is improving in rural areas, but there remains unmet demand.

A rural deficit of broadband persists in Canada, despite investments, new ISPs, and purchase agreements. By 2010 an estimated 2.1 million households in rural areas were in high cost-serving areas (CRTC, 2010a). As many as 700,000 of these households were classified as 'un-served' with less than 1.5 Mbps and another 1.4 million households were considered 'under-served' with less than 4Mbps. With such a significant number of Canadians in a digital deficit, Lord (2012) argued it is reasonable to consider being connected to the information highway as important for rural areas as railways, highways, and electrification. By comparison, Europe is moving forward even going so far as to regard making broadband a human right (LaRue, 2011). While not at the forefront of the Canadian debate, there have been similar calls from senior politicians and business leaders, for example Bernier (2012) and Lord (2012). However the real issue is resolving the rural broadband deficit. Clearly, this will require investment and technology that overcome challenges of long distance and low densities common throughout rural Canada (Reimer & Bollman, 2010).

Why, then, is providing broadband to rural and remote areas so important for Canada? As Mitchell (2013) points out in discussing the report of the National Broadband Taskforce of 2001:

> The task force concluded that the extension of broadband networks and services held considerable promise for the development of Canadian communities – particularly those in underserved areas. The committee felt that providing broadband access to rural and remote communities had the potential to improve the quality of life in many areas: education, information, security, culture, health. Based on this view, the main recommendation of the task force was that all Canadian communities should be provided with basic broadband connectivity by 2004.

With respect to targets and predicted outcomes after being connected to broadband, opinions vary. A rural ISP suggested that it is unlikely that more than 90% of Canadians will be connected to broadband services (Toderash, 2012), while CRTC (2010b) has stated an aspirational goal of 5Mbps for all households in Canada by 2017. Macdonald (2012) rightly states that nearly all Canadians have access to at least 3Mbps services through Xplornet today: noting those with heavy trees or obstruction may lack access.

Certainly for those rural areas without broadband service, one reason is that they are experiencing a failure of the market to meet this demand (Stiglitz, 1989). In such situations, the private sector cannot provide a service at a profit, so the state needs to become involved. In many situations, the state can recover some costs through taxation of commodities, regional taxation, or levying of user fees (Sadoulet & de Janvry, 1995). Often a market failure can be difficult to detect and can become viable with improvements in technology and increased demand with the revival of people moving to an area.

In rural areas that want better broadband service, what has emerged in the market place are partnerships between public and private sectors coupled with community-based commitments. In this special issue, one such multi-partner solution in

eastern Ontario is featured. The partnership brought Federal and Provincial Government funding and expertise with several private sector construction firms and ISPs together, along with a range of rural governments (Severson, 2013). Upwards of $115 Million dollars has been coupled with a net revenue sharing agreement so the ISP gets paid and profits shared with those taking the risk, including government investors. This example helps illustrate the point that partnerships can overcome technological, financial, and user demand barriers faced when serving under-served and high cost service rural areas.

Three important conclusions were drawn by the Forum from the above discussion about the rural digital divide in Canada today. First, the rural digital divide is being reduced, which means there is a dynamic situation where ISPs and investors are narrowing the gap in rural areas. However, these efforts are not evenly distributed over the rural geography, which means some communities are getting connected (the last mile) and others continue to be left behind. Second, service levels continue to increase at the same time, and many communities that met an acceptable standard at one time (e.g., 1.5 Mbps) will not meet it in the future (e.g., 5Mbps). Third, upwards to 10% of the rural customers (large data users, businesses, households, and those with geographical constraints for satellite) in Canada will likely remain without broadband by 2017, and possibly well beyond.

Following from the above discussion, the primary research question for this paper is: What are the key elements of an implementation framework to guide broadband investment in under-served rural areas? This question could be answered from economic and business perspectives, a technological feasibility view, as well as others including human rights. This paper answers this question from the view of senior government officials who have tried to overcome the challenges of large distance and low density in attempts to bring broadband service to rural areas. This paper moves beyond such challenges to propose a strategic implementation framework for bringing broadband to under-served rural areas. The key considerations for successful implementation are derived, not from a theory, instead from public and private sector practitioners, who in many ways are close to, if not recently on, the front line of this rural broadband challenge.

3.0 Method

Within this case study approach, the method follows the argument offered by Yin (2003), where the design of the method addresses clarification of the case, the role of the researcher, and how data is collected and analyzed. This case uses the current rural deficit of broadband as the primary topic, which involves many stakeholders. Of particular interest are a few senior government officials with significant knowledge of broadband services and complex working relations with many related stakeholders. This informal rural broadband forum (Forum) for under-served communities consisted of provincial government representatives from Manitoba eHealth (including MB Telehealth), Manitoba Innovation, Energy, and Mines, and federal government representatives from Health Canada and Industry Canada. All expressed support to have the Rural Development Institute (RDI) from Brandon University discuss their views and assist in formulating an action-based framework. The Forum wanted rural under-served communities, one after another, to get broadband service. They also wanted these rural communities to be actively involved, following a community-based participatory approach discussed by Wallerstein and Duran (2003). They did not want an academic study,

but rather they wanted to share their experiences while contributing where they could in the development of an implementation framework, and its subsequent initiation. As such, they became the primary information source to this project. This also meant a participant observer approach was used to collect data and validate the findings. Since both authors were involved in the Forum, it would be considered active participation by Emerson, Fretz, and Sahw. (2001). This method utilized working relations among the Forum members and involved the authors in both observing and participating in discussions, as well as assisting with written ideas and suggestions. Broadband specialists with ISPs and in government were also consulted to update knowledge, clarify existing advancements and identify location of services. At the same time, a literature review was conducted, in large part driven by questions from the Forum and specialists, along with suggested articles and readings. An iterative interaction between the Forum, specialists and the literature resembled the research approach by Glaser and Strauss (1967), where the researchers take clues from key data sources to assist in determining the scope of a literature review during the research.

As a result, data collection and analysis occurred in four steps:

- First, two Forum meetings identified challenges of rural broadband.
- Second, a preliminary literature review was initiated of available reports and papers that brought critical information into the discussions of the Forum.
- Third, broadband specialists from ISPs (large as well as independents) and government officials were contacted, usually by intercept unstructured interviews. Among many things, these specialists described current actions and implementation strategies to bring broadband service to rural areas.
- Fourth, during a third Forum meeting a proposed rural broadband implementation framework for under-served communities was critically reviewed and validated with revisions.

While quotes and attributions were generally unwanted by those in the Forum, summary comments of the meetings were acceptable and validated. Consent was given for quotes and references from the specialists.

4.0 Findings

The findings have been arranged in relation to the four steps of the method. The first step reflects the discussion from two Forum meetings which are summarized as challenges. The second step reports on a literature review or environmental scan which describes three difficulties to overcome with rural broadband and which informed much of the material in the introduction. The third and fourth steps are evident in the implementation framework, as an approach to change the rural deficit to a rural dividend in many of the under-served rural communities in Manitoba. Suggestions for further research conclude this paper.

4.1 Challenges of providing rural broadband

In terms of the geographical distribution, what emerged from the Forum discussions were many challenges and several questions for the effective development of rural broadband for under-served rural communities. For example:

where are under-served communities located? Are they clustered in one area? Are most in northern locations or near existing 'connected' urban centres? From a previous study of Manitoba (circa 2010), there were 420 of the 463 rural communities with broadband connections, most with 1.5Mbps (Coy, 2012). By this standard for broadband, about 43 were under-served communities, of which eight (8) were First Nation communities. These 43 communities had an estimated population in 2011 of 21,700 and ranged from 147 people to 2,493 people, with an average of about 500 people. These communities by most measures were small; if combined they were sufficient to support a high school or a health care centre. Even if their populations were pooled into one place, they would remain a very small market place for ISP investor. When their locations were plotted on a map (Figure 1) these Manitoba communities were widely distributed throughout the Interlake region and northern locations; some were only fly-in while others had only rail connection or winter ice roads. Yet, some were located near the City of Winnipeg and other smaller urban centres. This Manitoba case revealed at least one reason why these communities were under-served: they were dispersed over a very large geography, although they were not all based in the North, as some Forum members originally thought. It also needs to be understood that the minimal bandwidth assumption in this study, if upgraded to what is currently felt to be a more modern target (i.e. 5MB or even greater), would naturally result in a different picture, with possibly a doubling (or more) of underserved communities that will continue to face this service deficit on a chronic basis.

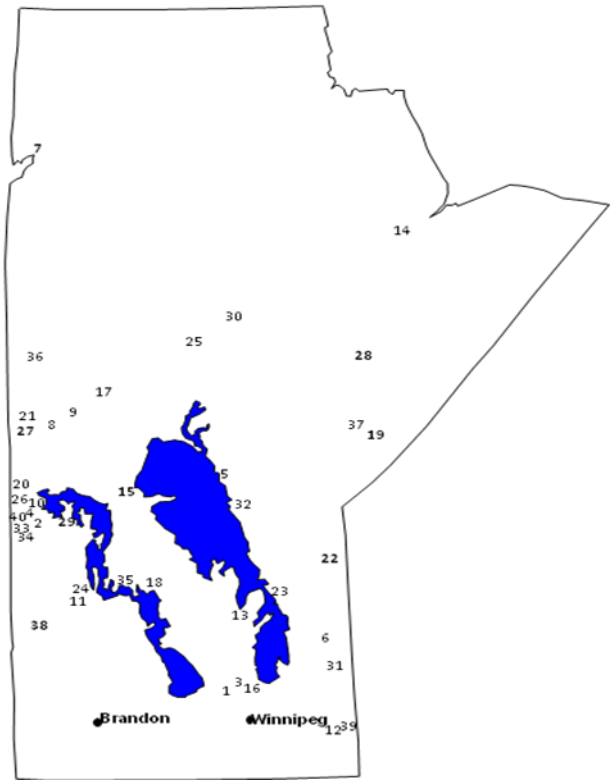

Figure 1. Rural communities under-served by broadband in Manitoba (circa 2010)

The wide geographical distribution of these communities can mean significantly higher installation costs of broadband services, which may outweigh the estimated returns for the ISPs. This means a viable business case with suitable returns on their investment over a reasonable time is made difficult. Also, with few people these rural areas limit future broadband sales and will incur higher recruiting costs for market penetration; both of these factors would be additional negatives to the business case for an ISP. As discussed in the Forum, it is likely that any one ISP could support only a limited number of broadband technologies, which sets a minimum customer base or market size (Peirce, 2012). As a result, the supported broadband technologies by an ISP may set minimum constraints for distance and population density for a viable business case, and constraints have to be met before investing or extending their service. The exception is the use of satellite services that does not require a minimum customer base (Macdonald, 2012). In turn, these factors negatively impact the feasibility of making subsequent investments for upgrades. Given the 'technological footprint' of an ISP is more or less set with their existing technological services, and their related supports and pricing structures, one or more of these aspects may have to be modified to bring services to under-served communities. If the current market place demonstrated the limit of the existing ISPs' ability to serve these rural areas, this suggests that some rural areas will remain chronically under-servered when it comes to broadband services. As discussed at the first Forum meeting, the underlying issue may not be that technology does not exist for these under-served rural areas; it might be that ISPs with their existing suite of technologies and support systems find it too costly to take on different technologies and related risks to service these rural areas. One member of the Forum noted, that without some different approach that permits ISPs to establish an acceptable business case, we will not find a way to consider a range of technology available from larger ISPs, and that these communities will likely remain under-served well into the future, and with little hope of this gap ever being closed. In some ways, what is needed is a differentiated policy response that incorporates such distances, low densities, and alternative technologies (Ashton 2011).

In Canada, the government response has been characterized by a number of different implementation strategies to extend such services into rural areas. One strategy has been to provide investment incentives to ISPs to extend their networks. The Alberta SuperNet is an example of a public sector initiative consisting of an estimated $300 Million investment to connect 422 (or 95%) of communities in rural and northern areas. SuperNet has brought 100Mbps to 14 cities and 10 Mbps to all other towns and villages. The connected public buildings included schools, health clinics and government offices (Mitchell, 2003). This was generally considered a top-down approach with government controlling who would be connected, where the majority gained access to a fibre optic service. In another strategy, the Federal Government's Action Plan stimulated the creation of new ISP organizations like NetSet and BCN, which introduced proven technology to connect rural households and businesses. Manitoba Hydro Telecom (MHT, 2012), a crown corporation with 'dark' fibre optic capacity, continues on a case-by-case basis to connect rural communities that are located near their network. The Hydro network, of course, has a primary purpose of servicing the generating infrastructure of hydro-electric generating stations, and the location of the data network capacity tends to follow the power transmission network. MHT now has some 27 communities connected (Shepard, 2010), including Hutterite colonies

where high speed conferencing enables one teacher to interact with a dozen high school classes in different colonies across southern Manitoba. Multi-stakeholder partnerships, as noted above in eastern Ontario, provided another innovative investment strategy to bring high speed broadband to rural areas. Collectively these strategies serve as examples of government policy filling in part of the broadband gap created by the inability of the marketplace to meet the needs in rural areas. Without some form of a more prominent role of government, usually by direct investment, it most likely means that larger private sector ISPs' business cases and their related technologies will continue to bypass rural areas, while labelling them 'high cost service areas'. In some regards, while these rural communities may become the untouchables to large ISPs, to others, like BCN, NetSet, and Xplornet, such communities become a new market opportunity. Using the Manitoba case, at least 43 under-served rural communities have been identified by members of the Forum, although the actual number is likely much higher.

4.2 Three important considerations regarding rural broadband

Given the discussions from the two Forum meetings, a general consensus emerged about three important implementation considerations, namely: the role of independent ISPs, examples of how an existing ISP provides rural broadband services, and clarification of economic benefits in rural areas from an improved broadband service. Each consideration is briefly discussed below in part because they are integral to understanding the rural broadband dilemma and may hold clues for an implementation framework.

One consideration was the role of independent ISP – those smaller companies using technology appropriate for their rural circumstances to provide broadband services. Some of these companies are interested only in broadband for data, while others provide broadband bundled with TV and phone or cell phone services. Independent broadband businesses can start off in many different ways, including resolving their own broadband needs and then 'accidentally' evolve into a local or regional ISP. RFNow is one such independent ISP company based in Virden, Manitoba (pop. 3,114). They wanted to solve their own insurance business needs. By the late 1990s, their business needed a simple Internet solution to connect their rural offices. As CEO Scott Andrew (2012, personal communications) explained, the larger companies sell Internet with other services, like telephones and cable TV, all bundled, but they wanted faster Internet speeds, which were not available from them. While developing their own broadband solution, they established their first client, which happened to be the local high school. That was 2000: by 2012, they were on their second generation of technology and had just finished installing 160 kilometers of fibre to serve over 1000 customers. In the meantime, this additional connectivity gave them a business advantage as a regional insurance broker and they grew rapidly by adding or acquiring 15 more branch offices, all connected by their network. RFNow, in this regional market, now operates as an ISP and has actually acquired a construction company that handles their installations and maintenance. They have identified a market niche, in terms of geography and services, employed a suitable technology and responded to their regional market and related demands, all the while learning, re-investing, and improving their technology and service.

Find an example of an ISP that is operating in rural areas was the second consideration. Despite such markets being labeled high service-cost areas,

Xplornet, a Canadian company originating out of rural New Brunswick, knows that by going into rural areas, their business case has to sustain the service for many years. As Macdonald (2012) explained, their prices may be higher, yet central to their business success is a local champion – a person who wants a part-time job, is willing to be trained, and is technically inclined and computer-savvy. For Xplornet, this person might be a technology teacher, a local technician, a business woman, or a retiree. With training, an interest in business, and a willingness to serve people, Xplornet designs and installs a standardized service using satellite and fixed wireless technology solution in the area, while the local technical person signs up new accounts, offers computer training, and even fixes them when needed. Broadband Communications North is another example of an ISP serving rural areas in Manitoba. Their business case was based on a 'contract approach' with key stakeholders in the community. They pre-booked local schools, hospitals or large data users as 'anchors' that signed a long term contract to ensure a base of revenues to offset their higher initial investment. It also means they sign up as early as possible local 'influencers' who by their actions serve as an example for others who in turn sign up – an approach familiar to those in rural development or rural extension (Strand, Cutforth, Stoecker, & Marullo, 2003). When serving rural areas and communities, successful implementation means beginning with a local technical champion, then signing up an anchor tenant and influencers, and then installing the system. In subsequent months penetrating the market is essential to acquire new customers. To the Forum members such a sequence of activities contributes to a business case for broadband services.

For the third consideration, Forum members wanted more information related to economic development benefits from broadband. From the outset, higher installation costs were suspected, but what benefits can be derived from extending broadband service? What benefits to public service agencies, like hospitals, and benefits to businesses and residents?

From a result of a preliminary view of related articles, it was clear the economic benefits from rural broadband projects were still being debated and more research was ongoing. Economic studies examined impacts at the global, national, and regional/local levels of broadband and e-commerce. The economic studies of rural broadband were associated with such topics as accelerating innovation, providing new services, reaching new customers, and attracting employment. Such benefits from SMEs, a business size which dominates the rural economic landscape, were realized more fully when local SMEs saw another business reporting success (Middleton & Tul-Hazra, 2011). Katz and Suter (2009) found positive economic impacts shortly after installing broadband in rural areas. The benefits continue to outweigh costs, even after four years when coupled with local training. Also, after introducing Internet, the ISP seeks more customers; for every additional 5-6% more customers they observed an estimated 0.6-1.8% more jobs in the local economy (Katz et al., 2009). Others, including Greenstein and McDevitt (2011), estimated that the economic multipliers in direct jobs in a community range from 1.38-1.83 during the construction of a new broadband system. These increases were largely from increasing direct staff as sales increased, and the ripple effect was estimated at 1.93-3.42 jobs (secondary). The peak in job creation was 12-18 months after installation, with some reduction and leveling off of new jobs after four years. Increases in employment were not evenly distributed among all sectors across the community. They were most often concentrated in such sectors as health, education, justice, financial, and manufacturing (Katz et al., 2009).

In contrast to the above positivist findings, another economic impact scenario of adopting broadband revealed the opposite regarding jobs. Cameron et al. (2005) found that the introduction of broadband resulted in job losses that were only recovered after several years. How can the deployment of broadband technology result in both increases in employment and decreases? In one example (Churchill, Manitoba), while some retail businesses experienced increased employment as online sales increased for mail orders, other businesses shed a few jobs as they re-located positions to a southern region tapping into a 'web' skilled labour force and lower shipping costs (Cameron, Annis, & Everitt, 2005). The contrasting findings related to the Churchill study illustrated the need for more empirical research based on an established baseline and follow up over several years to inform this economic debate with evidence.

As the Forum members discussed these economic impact findings, they concluded that economic benefits from connecting under-served communities may only be a modest part of a rural broadband investment decision or rationale. They also wanted to see how such investments in Manitoba could be tracked to provide more evidence. In addition, the Forum members identified three important observations about an implementation strategy: first there were benefits from broadband services in rural areas and they accrue over several years; second, such benefits were realized when coupled with training over several years; and third, public services such as health, education, and justice, can 'anchor' or be the main client in these under-served communities for a rural broadband service.

The Forum members acknowledged the importance of the three considerations, yet they wanted more than that list. They wanted a coordinated framework to help connect these under-served rural communities. Just as Middleton et al. (2011) noted, learning is central to further e-business adoption, so it can be argued that learning is central to finding a unique response to each of the under-served rural areas. RDI took on the challenge to draft an approach that was action oriented and addressed the needs and challenges of providing broadband to under-served rural communities in Manitoba – at least at the conceptual level. A few months would pass before the next Forum meeting, at which time RDI presented a draft 'integrated action framework' (IAF). It was eventually validated by those in the Forum and later benefited from two discussions: one with the Manitoba First Nations Information and Communications Technology Council, chaired by Chief David Crate; and another at the international conference held at The Moneison Centre, Queen's School of Business: *Connecting the future:* rural broadband *and technology, policy and impact*. It was clear there were many negatives or challenges to address to get to a suitable broadband response for under-served rural communities.

4.3 An integrated action framework for under-served rural communities

Behind the CRTC's label of high cost service areas rests many "No" responses. No, existing ISPs cannot invest in services in these rural areas at a profit with existing technology they employ. No, government programs have not been specifically organized to address unique market failures nor provided skills training for smaller rural groups. No, there does not seem to be a single solution that addresses issues across the many rural areas, even if narrowed to the 43 communities in Manitoba. No, communities have not really articulated their needs and their contributions to bring about broadband service. At the first Forum

meeting, the discussion mentioned many of these Nos and more, including the lack of return on such investments and the lack of not knowing the cost savings to public agencies (e.g., hospitals, justice) and individuals, if broadband was available. Yet what is the path forward? What does a Yes look like? If a yes is possible in one rural area, then it might be possible in another. If a path forward is possible in Manitoba, then that same path might be a possibility in other rural areas of Canada.

To get to a yes required responding to concerns related to the "Nos". Equally important getting to a 'yes' also involved a synthesis of the challenges coupled with the discussions with industry specialists and materials from the literature review. Two important imperatives for this framework emerged from Macdonald (2012), Parker (2000) and Toderash (2012): (1) deliver the right technology that fits the rural circumstances to give access, and (2) then address short and longer term social or human dimensions of introducing and using broadband services. Simply put, using technology gain broadband access then focus on the human side or infrastructure then social development.

These two imperatives became central to organizing an integrated action framework. As noted in Figure 2, the three primary aspects of such a framework are access to broadband, users, and uses. From discussions at the Forum, these were considered necessary for success, but insufficient by themselves. In addition, three supporting aspects related to human interactions completed this implementation framework, namely: leadership, local technician, and use of social marketing to sustain adaptation and learning. When taken together as an integrated framework, these aspects reflected, on the one hand, rural development practices of community capacity building, visioning, and strategic planning that are coupled with a focus on action and sustained change management (Rural and Small Town Program, 2005). On the other hand, these aspects can be measured in relation to best practices advanced by the Intelligent Community Forum (2012), a global source of experiences with broadband as it re-shapes lives and the economy. These include: collaboration, leadership, sustainability, connectivity, knowledge workforce, innovation, digital inclusion, and marketing.

The following describes the illustration of the integrated action framework (Figure 2), in terms of both the primary and secondary aspects of connecting a rural cluster to broadband service. Access means the fibre network can be brought to several rural communities in close proximity, and these form an 'install cluster'. Users mean there are both large data users, and businesses and individuals wanting broadband services. Uses mean there is an understanding of the demand for services and appropriate bandwidth for the install cluster of rural areas.

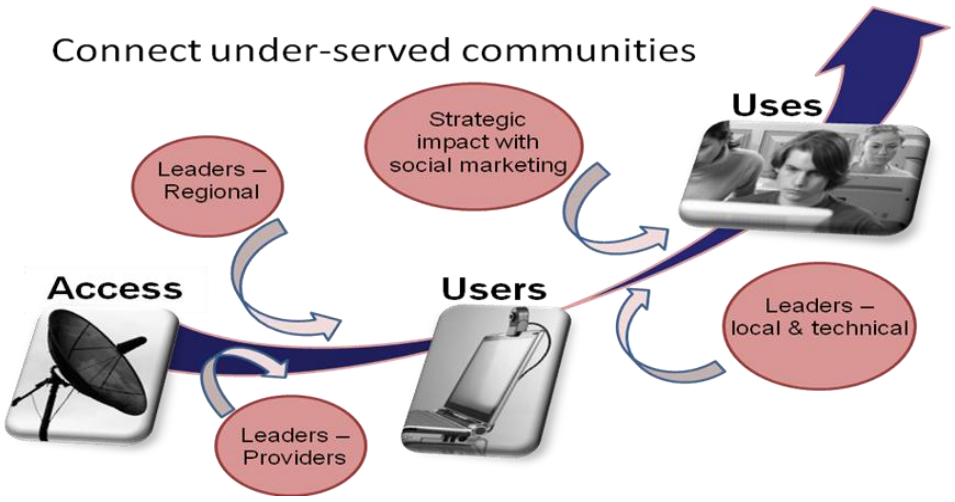

Figure 2. Key elements of an Integrated Action Framework for achieving rural broadband

Initially a cluster of communities gain access to broadband via specific technology partnership including an ISP, various levels of government and one or more local communities. The ISP begins with a new type of 'business case' that is a partner with the public sector for funding. Public investment is in part justified by a local market failure and the designation as a high service cost area. The government involvement is based on a business case that reflects estimates of positive impacts, including savings, such as those from reduced flights for health services, improved access to e-governmental services, and reduced travel costs for individuals and government agencies. The anchor, a 'heavy' data user (e.g., hospital, school, justice, lottery), is essential to initiate a broadband service into a rural cluster. A specific technology option is designed for the anchor which acts as a hub. The 'spokes' reach out from the hub to other users in the community and rural area. Getting business and residential users to sign up is a high priority and as such ensures maximum market penetration. Macdonald (2012) found that in small rural markets, signing up paying customers can occur very quickly.

The supporting elements to broadband access (or infrastructure) are human interactions. Leadership by ISPs and government will be essential. Both need to gather data to determine which communities among the 43 under-served are in the first install cluster, understand the needs of the anchor(s), select the suitable broadband technology, and build the investment 'case', along with ensuring the training has a strategic impact. A procurement policy will be required with an ISP, which might well be an independent or a more regional ISP. Another support element is a local technician, who without their commitment, most ISPs will not be involved. Coordination of training is needed to develop skills of business owners and others throughout the install cluster to enable higher rates of adoption. Finally to ensure economic and social impacts of broadband are realized, a 'strategic impact' approach is launched, designed on proven activities of social marketing. In this context, social marketing helps change behaviours toward favouring the use of broadband. As an approach, social marketing is well established as evident from such experiences as reducing water and energy use in the Waterloo region (Ashton, Howard, & Bond, 1979), helping people make healthy choices (Health Canada

2012), along with many other Canadian and American examples (Ashton & Shangvi, 2013; Kotler & Zaltman, 1971; McKenzie-Mohr, 2000). Social marketing serves to coordinate actions, engage people in communities, assess impacts (via assessment), and enable each new broadband initiative to under-served communities to continually plot their own growth and development objectives and goals.

The discussion at the Forum confirmed that any framework needed to address both technology and social aspects, along with the involvement of a range of stakeholders – one community cluster after another. These aspects of the framework address the fundamentals of a community-based approach for rural development, which are widely advocated, for example by Ramirez, Graham, Bigham, & Pellerin, (2006). The development argument recognizes broadband as an essential public utility and second, additional research is needed to more accurately account for the nature of interaction and innovation that broadband spawns in rural areas. Addressing the human aspects means taking a longer term timeline, and from the Forum discussions on an implementation time frame of three to five years for each cluster of communities was considered reasonable. As one community gets connected, Forum members were clear that other rural communities will want to see the successes and learn how it was achieved. To systematically benefit from a rural digital dividend, the integrated action framework searches for the technology response from an ISP and involves government leaders, investments, uses, and users. The Forum members favoured this framework in part because it was not advocating that one technology and social response fits all under-served rural areas. Over the longer term, the integrated action framework brings cohesion, engagement, and focuses on resource allocations; one implementation would inform the next rural community, though the technology solution may be very different, just as some of the stakeholders will differ. This entire process would repeat for each cluster of communities with public sector anchors being connected to broadband service. The Forum members were clear that this framework would have to be revised for those communities without an anchor tenant.

Connecting these under-served communities with broadband would take years. To sustain such a framework that gains the commitment of government and ISPs, and builds and maintains partnerships while engaging the range of under-served rural communities clearly needed what some call a "policy entrepreneur" (Roberts & King, 1991). The Forum members agreed on the benefits of endorsing the proposition of an 'expert-in-residence' with funding for at least seven years should be established and located at Brandon University's Rural Development Institute. With an estimated $2.5 Million cost for this position and related activities (RDI, 2013), such a duration would give new life, energy, and focus to connecting under-served communities, while being guided by the integrated action framework.

5.0 Conclusion

Key aspects make the Integrated Action Framework (IAF) applicable for many different rural areas in Canada. With a strategic implementation focus, the essential condition being addressed is the lack of broadband, which does exist in rural and northern Canada. As we found in the Manitoba case, such rural areas may not be very far from larger urban centres. With few prospects of better broadband service, the IAF brings together ISPs, government agencies, and communities. While the

ISP might well be an independent provider, the government agencies with their anchor facilities, be these health or school or justice facilities in the rural community, also exist in other parts of Canada. The incremental nature of having various sized install clusters requires a scalable implementation framework coupled with variable investment efforts. With the example given from eastern Ontario, a public-private partnership is certainly proven to work to bring ISPs, construction firms, governments (and their anchor facility), and communities into a collective to vastly improve broadband service. The IAF also calls for social development actions beginning with a local technician for the new network, and including skills training for business owners and residents. Again, skills development programs seem almost ubiquitous across Canada, yet what is needed is specific training that matches local needs of each install group. As one might expect, the training would be geared for fewer participants than would be available in larger urban areas.

As with any approach, the IAF has limitations. One major limitation is apathy. With under-served rural areas, commonplace across rural Canada, this suggests many ISPs are somewhat indifferent to them. As argued in this paper, what is needed is an initiative that brings forward another approach that gets to a reasonable alternative. While leadership is key with the IAF, it is also a limitation in terms of who might start the conversation about taking a few small steps with a few rural communities. A government official? An ISP? A community leader? With other social investment priorities facing government, a business proposition that includes the value of such an investment in rural communities is still needed and could be developed by a government leader. Another important limitation is where to start, or which cluster of rural communities is first? Certainly, part of the answer is an area where the ISP is interested in investing, where there is a public facility as an anchor, and where the community supports such an initiative. Although limitations of the integrated action framework exist, they also need to be address as part of any implementation effort.

Further research is critical to inform the integrated action framework, especially with case examples of partnership efforts. More socio-economic analysis is needed in terms of pre- and post-installation of broadband service to empirically determine costs and benefits, and job gain and loss. A more nuanced examination of which ISPs are investing in under-served rural areas and understanding their motivations and business case are needed. A longer term analysis of local businesses and residents would serve to examine how they use the improved broadband service and how they are advantaged with better access to e-government services, for example. After several install clusters have completed both the technical and social adaption to broadband services, a more macro study is possible to compare and contrast the fundamentals of the public-private partnership and the local and more regional impacts.

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