

Towards a Rural Digital Economic Strategy

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Executive Summary

Access to broadband infrastructure, and the equipment and skills to use the Internet to full advantage, are becoming increasingly critical to economic success. This is true everywhere. However, taking definitive action to improve access to digital technologies and the associated benefits in rural and remote areas of Canada, will have huge impact on rural economic development, including for Indigenous communities. Governments at all levels must implement strategies to ensure that Canadians living outside urban centres are able to use digital technology and through it are better served by governments, have increased means of communication, and are able to take part in the increasingly digitalized economy and its associated improved quality of life.

Chronic underfunding of Indigenous communities contributes to the lack of broadband infrastructure in these communities, but a lack of adequate infrastructure is also found in other rural areas. The federal government has committed to completing the pan-Canadian broadband network by 2030, although, especially throughout the pandemic, it has become increasingly obvious that this work cannot be allowed to take that long and must be the first objective of a rural economic digital strategy.

Taking advantage of improved access to high-speed Internet requires at least a basic level of digital skills. Canada's rural adult education systems can respond to the second objective of any such strategy: building these skills in rural residents.

To develop their strategy further, governments can draw on the experience of other jurisdictions that have already developed strategies designed to improve either rural economic capacity or the digital economy. Some learnings include:

- Community competency profiles can be used to capture an inventory of skills, including digital skills, identify skill gaps, and link communities and individuals to employers and training.
- “Opportunity zones” are surfacing local assets and uncovering investment opportunities (which could include patent activity, investment scores, and number of people with STEM degrees).
- Some First Nations communities, with support and funding from, and cooperation with, the federal and provincial governments manage their own broadband infrastructure and the services it enables.

- Rural innovation centres can deliver effective responses if they are geared to the size of the communities. Training, support of digital entrepreneurs, mapping where digital activity is – and isn't – and assistance with job placement are all helping rural communities become more engaged in the digital economy.
- Governments can jump start digitalization beginning with their own operations.
- A community should focus on what the community needs overall, build on its strengths in the digital sphere and also look at weaknesses and potential barriers to implementation.
- Cottage industries are an option: With the right equipment and training, rural and remote Canadians can work out of their homes as employees of companies which hire for a variety of digital jobs.
- Provinces should lay the groundwork for local communities to engage in developing their own digital economic strategies and be prepared to offer assistance at every step of the process.
- Local goals and strategies need to be determined at the local level
 - Goals of local digital strategies will vary in response to three stages of community readiness. While some communities may be ready to incorporate all of these strategies, others may choose to work on them sequentially starting with better communication and access to government services at all levels; improve quality of life; and increase economic development.
- Governments at all levels examine the regulatory implications of any proposed activities associated with digital strategy goals and make appropriate changes to enable the activities to be successful.

Based on our review of various economic and digital strategies from across Canada and the world, recommendations include:

- Any digital economic strategy should be developed with support from all levels of government.

Preface

“The future is already here – it’s just not evenly distributed.”

— WILLIAM GIBSON

This report contains a review of a variety of strategies and research: research on digital competencies and digital literacy; strategies to develop the digital economy in rural/remote economic development; national and community digital initiatives; and the digital cottage industry, as well as other related topics. Our goal is to inform the development of rural digital economic strategies for jurisdictions across the country.

Digital infrastructure is a critical component of any digital strategy. Governments at all levels are working towards increasing broadband capacity to rural and remote areas of the province. The need for better digital infrastructure is already recognized; indeed, significant strides have been made in implementing digital infrastructure across the country.¹ This report does not address digital infrastructure in depth.

While digital infrastructure is discussed where relevant, this report focuses on other strategic elements. The themes from sources have been identified and analyzed for their possible contribution to the development of a digital economic strategy at all levels of government.

THE PANDEMIC

In March 2020, the COVID-19 pandemic spread to Canada, forcing much of the workforce to stay at home. For the fortunate, this involved also working from home. This mode of work is new to many people and has been made possible through the array of digital tools designed to keep people connected. It has also forced many people to upgrade their digital skills quickly – these tools, while often designed to be intuitive, can take a bit of getting used to.

¹ Lynn Giesbrecht, “Access to high-speed internet on its way for 21 rural Sask. communities,” *Regina Leader-Post*, July 23, 2019, <https://leaderpost.com/news/saskatchewan/access-to-high-speed-internet-on-its-way-for-21-rural-sask-communities/>.

One important lesson that has emerged is that there are many more jobs than we ever imagined that can be done remotely. For some people, the quality of life offered by rural living may no longer require a trade-off with the ability to find work. Employers will come to realize that their hiring choices can be expanded to include candidates who do not live within commuting distance of the office. In particular for government, decentralizing operations doesn't necessarily mean setting up offices across the province – the possibility to hire people who can work from home means that people with mobility disabilities and those who live outside the major centres can participate in the public service if they have adequate internet access.

The impacts of COVID-19 on any digital economic strategy are still too new to fully assess – but it's clear there will be impacts. Connectivity has become massively important through this crisis – for accurate and timely information, health advice, applications for relief funding, connections with family and friends, working, learning and entertainment. This has also revealed a significant gap that exists between those with access to a reliable broadband connection and those who do not: those living under the poverty line, and many people who live in rural and remote areas.

Digital Economic Strategies

A digital economic strategy is, simply put, a strategy to encourage the growth of the digital economy within a jurisdiction.

Employment or economic opportunities are one of the main reasons that people migrate out of a rural area.² This migration has a multiplier effect: the more people who leave, the smaller the community and the fewer the economic opportunities that remain – which prompts more people to leave. However, being able to work remotely allows people who want to live in a rural community, and who would otherwise be forced to leave to find work, to stay.

Whether full-time or supplementary employment, digital work offers opportunities to communities and individuals. New models for economic development help rural communities support digital jobs, entrepreneurship, technical skill-building, and smart amenities to keep working-age adults in the community.³

A digital economic development strategy highlights digital aspects of the situation analysis, opportunities and action required.

Outcomes of a successful digital economy⁴

Digital employment: Workers are successfully matched with quality digital jobs that can be done from small towns, either through remote work or homegrown digital roles. *[Opportunities include employment and contract work.]*

Wealth creation: Local entrepreneurs build digital-related businesses and bring wealth back to the community, supporting other local businesses, stabilizing the community's tax base, and growing the local economy.

Elements that we call “direct drivers” match supply with demand by pairing people with job opportunities, or pairing start-ups with investors and markets. This means making sure that workers and start-ups are competitive for, and have access to, jobs and capital. Direct drivers support and build capabilities on the demand side — making workers and start-ups attractive to employers and investors — and create pipelines to supplies of jobs and capital.

In this report, first we will briefly describe the digital economy and its work-related features, then we will address the strategy itself.

² Statistics Canada. “Canada goes urban.” *Canadian Megatrends* Statistics Canada, May 17, 2018, <https://www150.statcan.gc.ca/n1/pub/11-630-x/11-630-x2015004-eng.htm>.

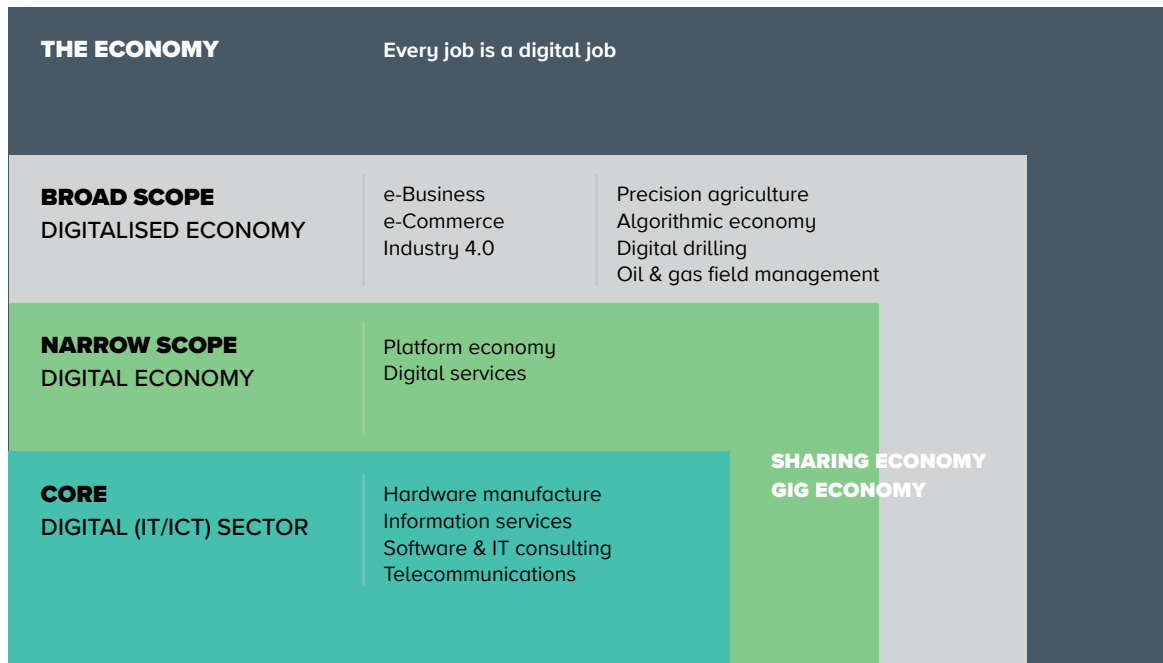
³ Center on Rural Innovation, <https://ruralinnovation.us/>

⁴ Our Digital Economy Ecosystem Model. Center on Rural Innovation, <https://ruralinnovation.us/rural-innovation-initiative/our-model/>

The Digital Economy

There is no agreement on exactly what the digital economy is, but we propose a definition that provides a wide scope of digital-esque jobs, and nuance regarding the level of digital involvement.⁵

SCOPING THE DIGITAL ECONOMY



Source: Defining, Conceptualising and Measuring the Digital Economy⁶

⁵ For example, see, Chris D'Souza and David Williams, "The Digital Economy," Bank of Canada Review, Spring 2017 and Kristel Van der Elst, "The Next Digital Economy," *Policy Horizons Canada*, 2019.

⁶ "Scoping the Digital Economy" based on Rumana Bukht and Richard Keeks, "Defining, Conceptualising and Measuring the Digital Economy," *Development Informatics Working Paper Series*, 2017, 13.

CORE | DIGITAL (IT/ICT) SECTOR

This sector produces fundamental digital goods and services. The jobs in this group are likely to be entirely digital and require a high level of digital competencies. Examples include information services, (management of electronic data, such as the storing of credit card numbers) and hardware manufacture of core digital tools, like cell phones and computers.

NARROW SCOPE | DIGITAL ECONOMY

Includes sectors that are based solely or primarily on making money from digital technologies, with business models based on digital services or goods. For example, the platform economy includes companies that have created a digital platform from which to sell goods or services, such as Amazon, Etsy, Shopify and Salesforce.⁷ Digital services are services that are delivered via the Internet, and often require little or no human interaction to deliver them. Digital services include cloud-based software like Microsoft Office, and music streaming services.⁸

BROAD SCOPE | DIGITALIZED ECONOMY

Sectors that have significant use of digital technology in a more traditional field. One example is precision agriculture, which uses technology to improve farming practices.

THE ECONOMY | EVERY JOB IS A DIGITAL JOB

All jobs require some level of digital competencies and access to digital infrastructure. Call centres, telemedicine, regulatory compliance processing are just a few examples of work that is both digital and distributed.

DIGITAL IS THE FUTURE OF WORK

Digital skills are increasingly essential

To some, the digitalization of the economy is progressing so rapidly it amounts to a “Fourth Industrial Revolution,” like the introduction of steam and electricity.⁹ However, the adoption of the technology is happening more rapidly and disrupting the workforce more completely. As Klaus Schwab, head of the World Economic Forum puts it, “the speed of current breakthroughs has no historical precedent. When compared with previous industrial revolutions, the Fourth is evolving at an exponential rather than a linear pace. Moreover, it is disrupting almost every industry in every country.”¹⁰ The title of Steven Kotler and Peter Diamandis’ recent book, *The Future is Faster than you Think*, sums up current reality.¹¹

When it comes to working in today’s economy, there is no doubt that digital skills are essential, for two reasons. One has been the creation of jobs that did not exist before the advent of the digital age. These include jobs in the design and building of hardware and software – such as software developers, robotics designers and technicians. The other is the digitalization of existing jobs, such as replacement of drivers by autonomous tractors used to plough and plant fields. Many jobs are increasingly reliant on digital tools that make workers more efficient and productive. Demand for adequate digital skills is growing for both types of jobs.¹² There is virtually no work that does not require some digital skills.

⁷ Martin Kenney and John Zysman, “The Rise of the Platform Economy,” *Issues in Science and Technology*, 4, 3 (Spring 2016): <https://issues.org/the-rise-of-the-platform-economy/>.

⁸ Victor Avelar, “What the Hell (Heck?) are Digital Services?” *Schneider Electric Blog*, August 3, 2016, <https://blog.se.com/datacenter/dcim/2016/08/03/digital-services/>.

⁹ Schwab, Klaus. “The Fourth Industrial Revolution: what it means, how to respond.” *World Economic Forum*, January 14, 2016, <https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/>; Marr, Bernard. “The 4th Industrial Revolution is Here – Are You Ready?”

Forbes, August 13, 2018, <https://www.forbes.com/sites/bernardmarr/2018/08/13/the-4th-industrial-revolution-is-here-are-you-ready/#6cb53302628b>; D’Souza, Chris, and David Williams. “The Digital Economy.” Bank of Canada Review, Spring 2017; Van der Elst, Kristel. “The Next Digital Economy.” *Policy Horizons Canada*, 2019.

¹⁰ Schwab, Klaus. “The Fourth Industrial Revolution.”

¹¹ Kotler, S. and Diamandis, Peter H. *The Future is Faster than you Think: How Converging Technologies Are Transforming Business, Industries and Our Lives*. Simon and Schuster, 2020

¹² Digital Literacy in a Digital Age: A Discussion Paper (Brookfield Institute, 2017) p. 3

The OECD provides a useful classification of what is happening to jobs on a global scale. Overall, digitalization has four impacts on jobs: creating new jobs, transforming existing jobs, losing out-dated jobs, and moving jobs.

Job Creation

Jobs are created, some of which are directly tied to technology, while others are in the related ecosystem. The number and types of these jobs are growing quickly, and the labour market is not responding as quickly. McKinsey estimated a shortage of 250,000 data scientists in the U.S. in the next ten years.¹³ Robotics scientists and technicians design, test and maintain systems for robots and the demand for robotics scientists is growing, as are robotics maintenance jobs. One example of how this is happening is in food processing which is rapidly becoming more automated.

The job of cyber security analyst is so new there isn't even a National Occupation Classification Code attached to it.

Technology can enable the creation of more business, which can lead to the creation of new jobs in more traditional sectors. For example, technology can enable companies to market more effectively – this will help the company grow overall, leading to more jobs created across the company.

Job Transformation

Jobs that already exist but are being transformed by technology. Workers must learn new skills and adapt to new realities in these jobs. Virtually every job in the traditional economy has been transformed or soon will be. From hotel room attendants recording the need for a light bulb in a freshly cleaned room using a cell phone app, to truck drivers keeping track of the condition of their loads on monitors connected to sensors located throughout the tractor-trailer, digital devices are part of every worker's day.

Fewer farm workers are needed for the same acreage because of larger equipment but now also due to technology (including digital technology). This means they also need digital skills to operate and (to some extent) repair the equipment and service and repair shops require trained digital expertise.

Job Relocation

In many cases, digital workers can provide digital services from anywhere – a company located in a rural community started by a local entrepreneur, a branch office of a larger organization operating in a rural community, individuals who serve as contractors for organizations who outsource digital work. Remote work enables people with a broadband connection, to work for a company anywhere in the world, but remain in Thompson, Man. or Swift Current, Sask. or Fort St. James, B.C.

Because the Internet enables remote work, many jobs can be performed from anywhere across the globe. For example, radiologists in India read X-rays and other diagnostic scans overnight for patients in North America, and customer service representatives for manufacturers in Digby, N.S. could diagnose the problem with a product and talk through solutions based on pictures transmitted by a cell phone for customers in Timmins, Ont.

Outsourcing digital jobs is a common way for organizations to expand capacity by accessing pools of talent beyond their local workforce. This can be done directly to individuals or through subcontractors.

The World Bank describes outsourced digital jobs as being either microwork or online freelancing. Microwork such as image tagging, data entry or text transcription is relatively low-skilled and can be used as an income supplement. Workers need only a basic level of skills and access to a computer/ internet connection to be able to do this kind of work. Freelancing, according to the World Bank,

¹³ James Manyika. Technology, jobs and the future of work. McKinsey. 2017.
<https://www.mckinsey.com/featured-insights/employment-and-growth/technology-jobs-and-the-future-of-work>

typically involves more advanced tasks, such as graphic design or report writing, and can be a primary income source.¹⁴

As well as generating income, a World Bank study suggests that this kind of work can help develop digital skills among workers as well, setting them up for more opportunities in the digital world.¹⁵

While these kinds of jobs can offer flexible timing and provide both supplementary income and build digital skills, they can be precarious as full-time jobs. Like other parts of the gig economy, workers in these jobs do not usually receive health benefits or other protections afforded by traditional jobs. There can also be a conflict with jurisdictional labour market rules about classification of employees versus independent contractors.

For more on remote work see the section on cottage industries below.

Job Obsolescence

Automation and the Internet make some jobs obsolete as technology provides alternatives. Customers who book flights online reduce the need for travel agents and robots have both transformed and replaced automobile manufacturing jobs.¹⁶

Takeaways for governments

- One way to nuance the digital economy strategy – and to make it more effective – is to develop a deeper understanding of how existing jobs in rural and remote areas are being created, transformed, moved or lost because of digitalization, technology and other employment drivers. The challenge will be to identify the skills of the individuals involved and how they can be transferred and, if necessary, upgraded.
- It is those who are ready to participate in this new economy who will benefit – others will be left behind. Any digital economic development strategy needs to include training opportunities for rural and remote citizens to include everyone.
- The growth of outsourced and remote work could provide opportunity for people living in rural and remote areas. Any digital economic strategy should consider the impact of the work on employee independence, flexibility, health and safety, and benefits.

¹⁴ Imaizumi, Saori, and Indhira Santos. "Online outsourcing: A global job opportunity for everyone?" *World Bank Blogs*, January 12, 2016, <https://blogs.worldbank.org/developmenttalk/online-outsourcing-global-job-opportunity-everyone>.

¹⁵ Siou Chew Kuek et. al., "The Global Opportunity in Online Outsourcing," June 2015, *World Bank*, 4.

¹⁶ OECD (2014), "Skills and Jobs in the Internet Economy", OECD Digital Economy Papers, No. 242, OECD Publishing, Paris, <https://doi.org/10.1787/5jxvbrjm9bns-en>.

Digital Skills

When digital jobs are discussed, the focus is often on jobs that rely entirely on high-level digital skills, such as software programmers or other ICT professionals. However, “the vast majority of jobs need people to have the skills and competencies required to leverage technology to its best advantage.”¹⁷

There are six broad groups of digital competencies: foundational digital skills; information and data literacy; communication and collaboration; problem solving; digital content creation; and digital safety.¹⁸ For each competency group, the European Union DigComp 2.1 Framework has identified several levels of competence, from base to highly specialized. Table 1 lists the skills that are included in the major categories.

Six broad groups of digital competencies:

01 Foundational Digital Skills

02 Information & Data Literacy

03 Communication & Collaboration

04 Digital Content Creation

05 Digital Safety

06 Problem Solving

¹⁷ Lane, Janet. “Digital Skills Decoded.” *Canada West Foundation*, December 2019, 1.

¹⁸ Lane, Janet. “Digital Skills Decoded.” *Canada West Foundation*, December 2019, 2-3.

TABLE 1: DESCRIPTORS OF DIGITAL SKILLS

FRAMEWORK CATEGORY	DIGITAL SKILL DESCRIPTION
01 Foundational Digital Skills	<ul style="list-style-type: none"> • Use of ICT-based tools to carry out tasks effectively, productively and with attention to quality • Work fluently across a range of tools, platforms and applications to achieve complex tasks • Computer and technical skills including basic Interaction with computers • Configuring computer and software options • Trouble shooting, problem solving • Setting up WiFi, connecting devices, etc.
02 Information & Data Literacy	<ul style="list-style-type: none"> • Articulate information needs; search for, locate retrieve, and navigate between digital data, information and content • Analyze, interpret, critically evaluate data, information and content • Judge the credibility and reliability of sources of data and information content • Store, manage and organize digital data, information and content
03 Communication & Collaboration	<ul style="list-style-type: none"> • Interact through a variety of digital technologies and understand appropriate digital communication in a given context • Share data, information and digital content and act as intermediary, knowing about referencing and attribution practices • Participate in society through public and private digital services • To be aware of behavioural norms while using digital technologies and adapt communication strategies to specific audiences • Manage digital identity and reputation
04 Digital Content Creation	<ul style="list-style-type: none"> • Create and develop digital content in different formats • Modify, refine, improve and integrate information into an existing body of knowledge to create new, original and relevant content • Understand how copyright and licenses apply to data, information and digital content • Programming: To plan and develop a sequence of understandable instructions for a computing system to solve a given problem or perform a task
05 Digital Safety	<ul style="list-style-type: none"> • Protect devices and content, understand risks, know about safety and security measures, and have due regards for reliability and privacy • Protect personal data and privacy, knowing how to use and share personally identifiable information and protect self and others from damages • Avoid health-risks and threats to well-being while using digital technologies • Be aware of the environmental impact of digital technologies and their use
06 Problem Solving	<ul style="list-style-type: none"> • Identify and solve technical problems when operating devices and using digital environments • Assess needs and identify, evaluate, select and use digital tools and possible technological responses to solve them • Use digital tools and technologies to create knowledge and to innovate processes and products • Understand own and other's digital competence needs to be improved or updated

Source: E.U. DigComp 2.1 Framework and JISC

The items shaded in grey are competencies required in professional information and communication technology jobs – such as those needed to develop software. The remainder are skills that are required at some level by most workers who use technology every day. The level of skill also depends on the type of technology and applications used at work.

Table 2 provides an example of a rubric for assigning levels of skill and assessing skills for the Problem-solving category listed in the DigComp 2.1 Framework.

TABLE 2: LEVELS OF COMPETENCE ADAPTED FROM EU DIGCOMP 2.1 FRAMEWORK WITH EXAMPLES OF DESCRIPTORS FOR PROBLEM SOLVING

		COMPLEXITY OF TASKS	AUTONOMY	COGNITIVE DOMAIN	PROBLEM SOLVING DESCRIPTOR
Base	1	Simple tasks	With guidance	Remembering	At basic level, and with guidance, I can identify simple digital tools and technologies that can be used to create knowledge and to innovate processes and products.
	2	Simple tasks	Autonomy and with guidance where needed	Remembering	At basic level, and with autonomy and appropriate guidance where needed, I can identify simple digital tools and technologies that can be used to create knowledge and to innovate processes and products.
Intermediate	3	Well-defined tasks and straightforward problems	On my own	Understanding	On my own, and solving straightforward problems, I can select digital tools and technologies that can be used to create well-defined knowledge and well-defined innovative processes and products.
	4	Tasks, and well-defined and non-routine problems	Independent and according to my needs	Understanding	Independently, according to my own needs, and solving well-defined and non-routine problems, I can differentiate digital tools and technologies that can be used to create knowledge and to innovate processes and products.
Advanced	5	Different tasks and problems	Guiding others	Applying	As well as guiding others, I can apply different tools and technologies that can be used to create knowledge and to innovate processes and products.
	6	[Choosing] Most appropriate tasks	Able to adapt to others in a complex context	Evaluating	At advanced levels, according to my own needs and those of others, and in complex contexts, I can adapt the most appropriate tools and technologies that can be used to create knowledge and to innovate processes and products.
Highly Specialized	7	Resolve complex problems with limited solutions	Integrate to contribute to the professional practice and to guide others	Creating	At a highly specialized level, I can create solutions to complex problems with limited definition using digital tools and technologies.
	8	Resolve complex problems with many interacting factors	Propose new ideas and processes to the field	Creating	At the most advanced and specialized level, I can create solutions to solve complex problems with many interacting factors using digital tools and technologies.

Source: DigComp 2.1

The OECD's Programme for the International Assessment of Adult Competencies (PIAAC) in 2012 showed that, as with the literacy and numeracy scores of working-aged adults, many Canadians ranked poorly in the assessment of problem-solving using technology. The next assessment of these skills for Canada will be in the field in late 2020 and the results will show if there has been an improvement in digital skills in the interim.

Takeaways for governments

It is crucial to know, in detail, the type and level of digital competencies held by people living in rural and remote areas. The first step in strategically deepening an involvement in the digital economy will require an understanding of what digital competencies people have.

A digital competencies framework would help employers, workers and education providers to understand and meet the digital needs of the economy. Adoption of a digital competencies framework would help provincial governments to create a more nuanced strategy for developing the digital economy in rural and remote areas. Canada's Information and Communications Technology Council has listed the skills needed in the digital economy.¹⁹ For a discussion of competency-based frameworks used in Canada and other countries, see the Canada West Foundation policy brief, *Digital Skills Decoded*.²⁰

Learning to learn skills

Digital skills are increasingly essential for any job – meaning workers must learn more of them and attain higher levels of proficiency. There are also prerequisite skills required to build digital skills and adapt to the landscape of the changing workplace.

The three learning to learn skills are: “communicating well – through speaking and listening (language); understanding and using printed and digital material (literacy); and, managing basic arithmetic (numeracy).”²¹

The Canada West Foundation estimates that, based on the PIAAC assessment of levels of learning to learn skills throughout Canada and the levels of these skills required to do various jobs, 48 per cent of workers in Canada are not adequately equipped with learning to learn skills or the skills they need to do their jobs really well.²²

Takeaways for governments

For rural Canadians to keep up in the digital economy, they need to have adequate learning to learn skills. However, many don't. For training to be effective, any digital skills training program will also need to assess people for their level of these skills and boost them where needed.

¹⁹ Skills in the Digital Economy: Where Canada Stands and the Way Forward. ICTC. 2016

²⁰ Ibid.

²¹ Lane, Janet, and T. Scott Murray. “The Literacy Hustle.” *Canada West Foundation*, February 2019, 1.

²² Lane, Janet, and T. Scott Murray. “The Literacy Hustle.” *Canada West Foundation*, February 2019, 2.

Rural & Remote Areas

The 2016 Census reveals that of Canada's 35 million people, about nine million live in rural and remote areas, spread over about 95 per cent of the country's land base.²³

A digital economic strategy for rural and remote parts of the country must pay attention to issues and situations that differ from those found in more urban centres: generally people in rural and remote areas have fewer years of formal education; earn less; have reduced or sporadic access to broadband Internet; and, have less access to technical supports.

Rural communities tend to have an older population, fewer immigrants and greater Indigenous representation.²⁴ Rural Canada also has a higher unemployment rate than the national average, while at the same time experiencing labour shortages "particularly of skilled workers and workers with the skill sets needed to work in the digital economy."²⁵

Building human capital can be a challenge in rural and remote areas – many people are reluctant or unable to leave home to go "to the city" for higher education or training opportunities. To meet this challenge, most provinces and territories have

polytechnical and college systems that help to meet training needs by offering some programs in local communities and offering programs through online and blended delivery services.

At the other end of the human capital challenge is that many young people, who leave home for work in bigger cities and towns or to attend post-secondary institutions, do not return to build a life in their home community.

This erodes the capacity of rural areas to attract employers who will create good jobs.

"Out-migration of youth reduces the ability of rural areas to stay vibrant and economically viable. It also decreases the capacity of the local population to support local businesses. ... The stock of human capital declines as one moves towards more rural areas. Recent studies have shown that the lack of human resources represent the greatest challenge to rural development in Canada. In fact, multinational and multi-locational firms in Canada have difficulty finding qualified workers in rural areas."²⁶

²³ <https://www.canada.ca/en/health-canada/services/healthy-living/just-for-you/rural-canadians.html>

²⁴ Infrastructure Canada. "Rural Opportunity, National Prosperity: An Economic Development Strategy for Rural Canada." *Government of Canada*, 2019, 3.

²⁵ Infrastructure Canada. "Rural Opportunity, National Prosperity: An Economic Development Strategy for Rural Canada." *Government of Canada*, 2019, 17.

²⁶ Moazzami, Bakhtiar. Strengthening Rural Canada: Fewer and Older: Population and Demographic Crossroads in Rural Saskatchewan. *Essential Skills Ontario*, 2015, p 7

There are often only one or two key industries in a rural or remote community. When these industries are closed, scaled back or changed by digitalization or other causes (which they inevitably will be), the community may not have the digital skills to keep up with the change, which could result in companies downsizing, outsourcing jobs or leaving entirely. If that happens, a community that has low levels of digital skills will not be ready for other new jobs. Some of the industries that communities have come to rely on – such as mining and oil and gas – risk significant change and automation for many positions.²⁷

Maps and mapping software for rural municipalities can be used to build out regional profiles to inform their work. Examples include: “opportunity zones” (which have a mix of broadband access, number of start-ups, etc.) that are surfacing local assets and uncovering investment opportunities (which include patent activity, investment scores, and number of people with STEM degrees).²⁸

Attracting new people, particularly recent immigrants, to rural and remote communities is often a challenge in Canada.²⁹ This is a double-edged sword: limited broadband often discourages new people from coming to the community, while at the same time these new residents would often be able to provide much needed digital skill and experience.

LACK OF INFRASTRUCTURE MOST PRESSING PROBLEM

As noted earlier, digital infrastructure is not a central focus in this paper. However, we would be remiss not to mention that digital infrastructure is a crucial and *first* step in achieving the growth of the digital economy in rural and remote areas. Comparable to the railways and highways of previous generations, Internet infrastructure is what will allow rural and remote areas to participate in the larger economy.³⁰

According to a Statistics Canada study in late 2018, nine percent of rural dwellers had no access to Internet at home compared to five per cent of urban dwellers.³¹ Rural Canada is being left behind in the digital economy because broadband access is much more limited than in urban Canada.³² As a result, access to the digital economy, and ability to acquire digital skills, are severely limited.

The Canadian government has target speeds for broadband – 50 megabits per second download (Mbps) and 10 Mbps upload. While 97 per cent of urban households can access this speed, only 37 per cent of rural households can.³³ The federal government’s goal is to have 100 per cent of Canadian homes and businesses with access to high-speed internet by 2030. To that end, the federal government committed \$5 billion to \$6 billion over the next ten years to digital infrastructure in rural and remote Canada.

²⁷ Learning Nation: Equipping Canada’s Workforce with Skills for the Future (Advisory Council on Economic Growth, 2017), 2.

²⁸ Center on Rural Innovation, <https://ruralinnovation.us/>

²⁹ Infrastructure Canada. “Rural Opportunity, National Prosperity: An Economic Development Strategy for Rural Canada.” *Government of Canada*, 2019, 9.

³⁰ Centre on Rural Innovation.

³¹ <https://www150.statcan.gc.ca/n1/daily-quotidien/190225/dq190225c-eng.htm>

³² Infrastructure Canada. “Rural Opportunity, National Prosperity: An Economic Development Strategy for Rural Canada.” *Government of Canada*, 2019, 9.

³³ Infrastructure Canada. “Rural Opportunity, National Prosperity: An Economic Development Strategy for Rural Canada.” *Government of Canada*, 2019, 8.

Many smaller community digital strategies recognize the utmost importance of digital infrastructure. The Federation of Canadian Municipalities notes that “high-speed internet access is crucial to doing business and running local public services.” It recommends that the federal government provide long-term, predictable funding for expanding broadband in rural and remote communities.³⁴

Agriculture, a major economic driver across Canada, has become much more automated and digitalized. New farm equipment and agricultural sensors are engineered to send data to farm operators. Weak or inconsistent bandwidth reduces optimal use of this equipment and agricultural inputs, which in turn reduces outcomes for both the sector and the province’s economy.

COVID-19 has illuminated the wide gap between rural and urban communities’ access to broadband. People who live in rural areas and who have been working from home during the pandemic rather than commuting into the city are often at a disadvantage. CBC has reported that download speeds can be very slow, and members of a family are often competing for bandwidth with each other.³⁵

Takeaways for governments

- The best way to deliver training in remote areas is often online – but only if people are ready for it. Canada’s rural adult education systems need to be part of any rural digital strategy. Whether at the community, employer or individual level, a range of digital skills training can be made available through these existing institutions.
- Improving access to digital infrastructure for rural and remote areas of the province is a virtuous circle. Without adequate infrastructure it will be more difficult to attract, train and retain workers for rural and remote parts of the province. And without skilled workers, firms will not locate or stay in those regions.
- Data and mapping to increase rural impact: create maps and mapping software for rural municipalities to use to inform their work, like opportunity zones previously mentioned on page 16.
- Beyond mapping, community competency profiles can be used to capture an inventory of skills (including digital skills), identify skill gaps and link communities and individuals to employers and training. EXPORT, developed for Indigenous communities by the Saskatchewan First Nations Natural Resource Centre of Excellence (<http://skfncentre.ca/export.php>) is an example of what is being done.

³⁴ Federation of Canadian Municipalities, “Rural challenges, national opportunity: Shaping the future of rural Canada,” *Federation of Canadian Municipalities*, 2019, 13.

³⁵ <https://www.cbc.ca/news/canada/saskatchewan/internet-rural-remote-saskatchewan-covid-19-1.5562476>

Rural & Remote Indigenous Communities

Rural and remote Canada is home to many Indigenous people. As an example, the Northern Saskatchewan Administration Division (NSAD) is almost entirely rural and remote – it encompasses 49 per cent of Saskatchewan’s land mass, but only 3.4 per cent of its population (roughly 38,000 people). Just over half of the people who live in NSAD live on Indigenous reserves.³⁶

Like other rural and remote communities, NSAD lacks the infrastructure to support digital competencies and digital economic opportunities. There is wide variation in involvement in the digital economy amongst rural, remote, and Indigenous communities; the communities that are the least involved tend to be Indigenous.³⁷

However, there are a couple key differences between Indigenous and non-Indigenous communities rural and remote communities, the most important of which is in government structure. Non-Indigenous communities are governed and provided services by municipal, provincial, territorial

and federal governments. Indigenous communities on reserves are governed by Chief and council – they are responsible for essentially everything, with funding provided via treaty rights through the federal government.

This is important for the digital economy for three reasons:

- 01 Recent reports, particularly for education and infrastructure, demonstrate that Indigenous communities are often underfunded.³⁸ Broadband infrastructure for rural and remote areas will be expensive to establish and maintain – if communities are already underfunded, it will be extremely difficult to find the money with current funding levels.
- 02 Broadband may be even more important in these communities than in others. If there is only one government that is responsible for supplying all services, it would make sense to

³⁶ “The Northern Saskatchewan Administration District,” *Planning for Growth North Saskatchewan*, <https://www.planningforgrowthnorthsk.com/the-northern-saskatchewan-administration-district-nsad.html>.

³⁷ Ken Coates, “Creating Digital Opportunities for Canada,” Presentation, *Munk School of Public Policy*, https://munkschool.utoronto.ca/ipf/files/2019/04/Coates_RuraRemote-Regions-DigitalDivide-final-slides-12AP.pdf.

³⁸ See Pamela Palmater, “First Nations water problems a crisis of Canada’s own making,” *Policy Options*, February 6, 2019, <https://policyoptions.irpp.org/fr/magazines/february-2019/first-nations-water-problems-crisis-canadas-making/>;

and Jody Porter, “First Nations students get 30 per cent less funding than other children, economist says,” *CBC News*, March 14, 2016, <https://www.cbc.ca/news/canada/thunder-bay/first-nations-education-funding-gap-1.3487822>.

³⁹ Susan O’Donnell et. al., “Digital Technology Adoption in Remote and Northern Indigenous Communities in Canada,” *Canadian Sociological Association 2016 Annual Conference*, University of Calgary, <http://firstmile.ca/wp-content/uploads/2016-CSA-Digital-Technology-Adoption.pdf>.

have some services available through digital platforms. This could enable the community to be able to provide services more efficiently and in a more cost-effective manner, enabling a better standard of living within the community.³⁹

- 03 One issue for Indigenous communities, connected to funding, is often a lack of financial independence. Earlier work done by the Canada West Foundation points to the importance of financial independence for many communities.⁴⁰ Having broadband infrastructure and people in the community with strong digital competencies opens the path to many different forms of income, which could ultimately be crucial in the creation of greater financial independence.

The literature noted that some Indigenous communities have taken the approach of community-based digital infrastructure and economic development, as opposed to a household or individual first approach. This enables key institutions within the community to become involved with the digital sphere first. This places emphasis on the importance of services and fits with strong community ties that many Indigenous communities have.⁴¹

RURAL/REMOTE INDIGENOUS SUCCESS STORY K-NET

The Kuhkenah Network (K-Net) is a unique First Nations owned and operated ICT provider, based primarily in Ontario but also extending to Manitoba and Quebec. Based out of Sioux Lookout, Ont., K-Net is a program of Keewatinook Okimakanak, which is a First Nations tribal council established by

Deer Lake, Fort Severn, Keewatin, McDowell Lake, North Spirit Lake and Poplar Hill bands provides a variety of support services for these communities.⁴²

Many K-Net communities have no permanent road access and depend on local initiatives to maintain basic amenities like electrification, potable water, waste management, and telecommunications.⁴³

K-Net was first developed in 1994 to enable high school students who had to live far from their homes to communicate with their families.⁴⁴ By the mid-2000s, K-Net service quality and breadth had expanded to fully integrated services.⁴⁵

How K-Net works

Today, K-Net provides telecommunications infrastructure, information and communications technology (examples include software applications, operating systems, video equipment) and application support. However, K-Net goes beyond providing these services, and facilitates for First Nations communities and organizations. It brokers relationships between communities and various agencies to provide a wide range of services in the communities including, Keewatinook Internet High School (KiHS), telehealth applications, Industry Canada's First Nations SchoolNet, email, videoconferencing, webcasting, and more. It is a vertically integrated service provider meeting the needs of its constituents.⁴⁶

K-Net is decentralized to the greatest extent possible. First Nations communities own and operate local loops that allow communities to adapt broadband services to address local priorities and concerns. One community may want to focus on digital education opportunities, while others want to focus

⁴⁰ Marla Orenstein and Sarah Pittman, "Forward Together," *Canada West Foundation*, June 2019, 3.

⁴¹ Susan O'Donnell and Brian Beaton, "A 'Whole-Community' Approach for Sustainable Digital Infrastructure in Remote and Northern First Nations," *Northern Public Affairs*, <http://www.northernpublicaffairs.ca/index/volume-6-special-issue-2-connectivity-in-northern-indigenous-communities/a-whole-community-approach-for-sustainable-digital-infrastructure-in-remote-and-northern-first-nations/>.

⁴² K-Net Services <https://knet.ca/>

⁴³ Adam Fiser and Andrew Clement, "K-Net and Canadian Aboriginal Communities," *IEEE Technology and Society Magazine*, Summer 2009, 23.

⁴⁴ Adam Fiser, Andrew Clement, and Brian Walmark, "The K-Net Development Process," *Canadian Research Alliance for Community Innovation and Networking*, February 2006, 5-6.

⁴⁵ *Ibid.*, 3.

⁴⁶ *Ibid.*, 3.

⁴⁷ *Ibid.*, 3.

on telehealth, while others want to focus on leveraging digital access for economic development.⁴⁷ K-Net works because it is based on longstanding community ties; it can work closely with communities to help them centralize their own operations for their own benefit.

K-Net's business model aggregates the costs for all communities and partner organizations and then shares the costs amongst them, so communities in high cost areas can better afford them. Costs to communities are also minimized by pooling resources. Community costs are split between various public and private services that operate within the community – for example the local governing authority, school, nursing station and residential internet service provider. Federal and provincial grant programs also support K-Net, with the caveat that its technical configuration and management structure comply with various public service requirements.⁴⁸

K-Net Challenges

The main challenge is the same for many remote communities: many communities connected by K-Net have no permanent road access and they must rely on local initiative to provide basic amenities.⁴⁹ Related to this is the extremely high cost of services, particularly broadband. Historically, broadband infrastructure in these areas has depended on private telecom companies receiving public funds to build the telecommunications infrastructure, and then charging communities high rates for service and access.⁵⁰

The best justification for telecoms coming to a remote area is a public good justification, which requires support from both the government and buy-in from industry.⁵¹

Finally, communities in K-Net's catchment area are widely diverse, and so a cookie-cutter approach to broadband for each community will not work.

Why K-Net is Successful

K-Net is successful because it was able to find a path through all of the above challenges and develop a way for each community to maintain a certain level of control over their local internet. There are several elements to their success:

- Pooling resources: even with support from federal and provincial governments, internet access is very expensive. Communities can lower it by pooling resources and sharing expertise so costs of maintenance, upgrades, etc. can be shared among the community. Communities can also get a better price negotiating together rather than apart.
- Communities have responsibility over their local loops and can tailor it to what suits their needs best: for example, treating it as an enterprise, or as a public service.⁵²
- The division between what K-Net does and what the communities do: K-Net's team helps the communities negotiate contracts and service agreements, and partners with various levels of government and organizations to support the growth of K-Net.⁵³

⁴⁸ Adam Fiser and Andrew Clement, "K-Net and Canadian Aboriginal Communities," *IEEE Technology and Society Magazine*, Summer 2009, 29-32.

⁴⁹ Adam Fiser and Andrew Clement, "K-Net and Canadian Aboriginal Communities," 23.

⁵⁰ First Mile Connectivity Consortium (2018). *Stories from the First Mile: Digital Technologies in Remote and Rural Indigenous Communities*. First Nations Innovation and First Mile Connectivity Consortium. Fredericton: FMCC, 37.

⁵¹ Adam Fiser and Andrew Clement, "A Historical Account of the Kluh-ke-nah Network," in *Connecting Canadians*, ed. Andrew Clement et. al. (Edmonton: AU Press, 2012): 275-6.

⁵² Adam Fiser, Andrew Clement, and Brian Walmark, "The K-Net Development Process," *Canadian Research Alliance for Community Innovation and Networking*, February 2006, 7.

⁵³ Brandi L. Bell, Philipp Budka, and Adam Fiser, "We Were on the Outside Looking In," in *Connecting Canadians*, ed. Andrew Clement et. al. (Edmonton: AU Press, 2012): 244.

- Brain drain: Brain drain can be a significant problem for communities – people with technical expertise leaving the area for better opportunities. K-Net resolves this by focusing on investing in skilled personnel that have ties to the Northern, remote Indigenous communities.⁵⁴
- Education: K-Net has survived for so long in part because of the educational aspect. K-Net staff have worked to impart a “technology curriculum, or culture of use” in each of the communities, by providing workshops and supporting individual community champions.⁵⁵

Public funding: K-Net emerged out of a national movement to “computerize” communities, and as such, K-Net was supported by significant government funding, particularly through a former Canadian initiative called *Connecting Canadians*. K-Net did the groundwork to get this built but buy-in from government was required.⁵⁶

Takeaways for governments

- Chronic underfunding of Indigenous communities contributes to the lack of broadband infrastructure in these communities.
- Broadband infrastructure could enable cost effective delivery of a variety of services – health, education and social.
- Improving broadband in these communities would enable economic independence.
- Some First Nations communities, with support and funding from, and cooperation with, the federal and provincial governments manage their own broadband infrastructure and the services it enables.

⁵⁴ Adam Fiser and Andrew Clement, “K-Net and Canadian Aboriginal Communities,” *IEEE Technology and Society Magazine*, Summer 2009, 32.

⁵⁵ Brandi L. Bell, Philipp Budka, and Adam Fiser, “We Were on the Outside Looking In,” in *Connecting Canadians*, ed. Andrew Clement et. al. (Edmonton: AU Press, 2012): 245.

⁵⁶ Adam Fiser and Andrew Clement, “A Historical Account of the Kuh-ke-nah Network,” in *Connecting Canadians*, ed. Andrew Clement et. al. (Edmonton: AU Press, 2012): 256.

Rural Digital Opportunities

There are some innovative approaches to improving digital entrepreneurship in rural settings.

Rural Innovation Centre, Acadia Entrepreneurship Centre, Nova Scotia⁵⁷

The goal of the Centre is to incubate rural start-ups, particularly by providing access to working space/digital infrastructure, networking opportunities, mentors and more. The site provides room for ten tenants to work. Companies can lease space for one year at the Centre, and when applying must demonstrate that they have “a unique innovation and how residency in the incubation services will accelerate your success.”⁵⁸

The Centre is based at a branch of Acadia University in Wolfville, N.S., which has a population of just over 4,000.

There are a wide variety of services available for tenants to use. In the digital sphere, this includes “Innovation Development” including things like IP development advice, and skill development in key areas, one of which is ICT.

Centre on Rural Innovation⁵⁹

Based in Hartland, Vt. (population c. 3,400), the Centre on Rural Innovation is focused on “bridging rural America to the future of work.” It has three main activities:

- New models for economic development: help small towns make economic development strategies that focus on digital jobs, entrepreneurship, technical skill-building and smart amenities to keep working-age adults in the community.
- Data and mapping to increase rural impact: create maps and mapping software for rural municipalities to use to inform their work.

Examples include: “opportunity zones” (which have a mix of broadband access, number of start-ups, etc.), are surfacing local assets and uncovering investment opportunities (which include patent activity, investment scores, and number of people with STEM degrees).

- Direct investment in rural entrepreneurs: a fund that focuses on investing in tech start-ups in rural areas.

⁵⁷ Acadia Entrepreneurship Centre, “Rural Innovation Centre,” <https://www.acadiaentrepreneurshipcentre.com/rural-innovation-centre/>.

⁵⁸ Acadia Entrepreneurship Centre, “Rural Innovation Centre,” <https://www.acadiaentrepreneurshipcentre.com/rural-innovation-centre/>.

⁵⁹ Center on Rural Innovation, <https://ruralinnovation.us/>.

The overarching goal of the Centre is to create a network of “innovation hubs” across the rural United States. These hubs will have co-working spaces, a variety of community attractions (restaurants, shops), fast, reliable broadband, and will offer training and mentorship programs.⁶⁰

Rural Innovation Lab, New Zealand⁶¹

This Rural Innovation Lab, based in Palmerston North, N.Z. (city of c. 80,000) is a “platform of collaborative partners supporting farmers and growers to experiment with, up-skill in, and drive technology and innovation” meant to support the whole region.⁶² It focuses primarily on agriculture, with an emphasis to improve agriculture overall through technology and innovation.

The organization is described as a “connector and facilitator.” Additionally, it also provides funding for innovative rural projects. For example, there is an ongoing project to provide access to broadband for isolated rural communities.⁶³

The Rural Innovation Lab is being financially supported by a number of organizations, such as Microsoft New Zealand and Massey University. It also received a cash injection of NZ\$400,000 from the city.

MTEC SmartZone⁶⁴

Located in Houghton, Mich. (population c. 8,000), MTEC SmartZone is aimed at tech start-ups and tech commercialization in the region. It sees itself as “the leader in entrepreneurship and high-tech business acceleration” in an area of Michigan known as the Keweenaw Peninsula. It offers three services:

- GrowthWheel: a cloud-based “visual toolbox” that is used by business advisors to help businesses grow.
- SmartStart: a six-week course designed “for anyone with a business idea.” It is meant to help people grow entrepreneurial skills and develop a roadmap for their business idea.
- TalentBridge: designed to support existing companies that want to grow. Works with Michigan Technological University to engage with graduates.

MTEC SmartZone offers a detailed pitch for why people should live and work in their region. Reasons include high-quality education, access to nature, a largely collaborative local economy, and high access to STEM talent. It also emphasizes some of the small town/rural benefits of the region: “Don’t let our small towns and low cost of living fool you. Some of the most progressive innovators, companies, educators and researchers are changing the world right here. ... Innovation Shore is one of America’s last true traditional small and safe towns. We live where neighbours help each other out with no expectations.”

Digital Competencies Pilot Project, Rural Iowa

Accenture and Corteva AgriScience partnered with Des Moines Area Community College to develop a pilot program for rural Jefferson, Iowa (population c. 4,300). It’s designed to train the people there in “high-demand, high-value software development technology skills.”⁶⁵ The purpose is to enable these highly trained people to stay in their community. Corteva will fund 25 scholarships for the College’s

⁶⁰ Hensel, Anna. “Ex-Google exec Matt Dunne has a plan to create a string of tech hubs across rural America.” *Venture Beat*, November 9, 2017, <https://venturebeat.com/2017/11/09/ex-google-exec-matt-dunne-has-a-plan-to-create-a-string-of-tech-hubs-across-rural-america/>.

⁶¹ *The Rural Innovation Lab*, <https://www.ruralilab.net.nz>.

⁶² “The Rural Innovation Lab Story,” *The Rural Innovation Lab*, <https://www.ruralilab.net.nz/about-2>.

⁶³ “Whanganui teenager receives Rural Innovation Lab support for broadband business,” September 10, 2019, https://www.nzherald.co.nz/farming/news/article.cfm?c_id=195&objectid=12266069.

⁶⁴ MTEC SmartZone, <https://www.mtecsz.com/who-we-are/>.

⁶⁵ Janczura, Tina, and Kavey Birchmier. “Accenture Collaborates with Corteva Agriscience on Pilot Program to Bring Technology Skilling to Rural Iowa.” *Accenture*, June 5, 2019, <https://newsroom.accenture.com/news/accenture-collaborates-with-corteva-agriscience-on-pilot-program-to-bring-technology-skills-to-rural-iowa.htm>.

Computer Languages program; after completion of the program participants will participate in a four-month commercial software development training with Accenture.

Digital Works in Newaygo, Michigan⁶⁶

Digital Works is a job-creation program that focuses on “high-demand telework professions.”⁶⁷ All of the jobs they train for and do placements for are remote. Newaygo, Mich. has a population of fewer than 50,000. The Digital Works office there serves two broad groups of people: those who need to work from home, and those who don’t have Internet access to work from home. The second group is able to work at “The Stream,” a remote working space which also houses Digital Works.

Takeaways for governments

Rural innovation centres can deliver effective responses if they are geared to the size of the communities. Training, support of digital entrepreneurs, mapping where digital activity is – and isn’t – and assistance with job placement are all helping rural communities become more engaged in the digital economy.

⁶⁶ O’Morrow, Rachel. “Digital Works Center Opens in Newaygo, Michigan.” *Digital Works*, <https://digitalworksjobs.org/digital-works-center-opens-in-newaygo-michigan/>.

⁶⁷ Digital Works, “What we do.” <https://digitalworksjobs.org/about-us/>.

National Digital Strategies

There are many national digital strategies around the world. We selected strategies most useful to a rural context, namely New Zealand, Australia and Canada, with an emphasis on Canada.

CANADA'S DIGITAL CHARTER

The federal government has organized its digital strategy around a digital charter, which is described as “the foundation that will allow us to build an innovative, people-centred and inclusive digital and data economy.”⁶⁸ The charter is the basis of a number of different actions, such as an intellectual property strategy, the Canadian Digital Service (digitalization of government services), Skills Boost (which supports adults who want to upgrade their skills at post-secondary institutions), and Connect to Innovate, which is investing \$500 million by 2021 to bring high-speed internet to 300 rural/remote communities.⁶⁹

The Charter has 10 principles. The most relevant include:

- “Universal Access: All Canadians will have equal opportunity to participate in the digital world and the necessary tools to do so, including access, connectivity, literacy and skills.

- Open and Modern Digital Government: Canadians will be able to access modern digital services from the Government of Canada, which are secure and simple to use.
- A Level Playing Field: The Government of Canada will ensure fair competition in the online marketplace to facilitate the growth of Canadian businesses and affirm Canada's leadership on digital and data innovation, while protecting Canadian consumers from market abuses.”⁷⁰

Canada's Digital Charter in Action

Additionally, the federal government has created the *Digital Charter in Action*. By using the ten principles, and based on public consultations, the government determined three areas of the digital sphere upon which to focus: skills and talent, innovation, and privacy and trust, all three of which are broken down by the problem and what was heard at the consultations. The most relevant from each is included below.

Skills and Talent

The federal government identifies that Canada still has important skill gaps, and that “Canadians must be equipped with the right competencies

⁶⁸ Minister of Innovation, Science, and Economic Development Navdeep Bains, “Canada's Digital Charter – Trust in a digital world,” *Government of Canada*, https://www.ic.gc.ca/eic/site/062.nsf/eng/h_00108.html.

⁶⁹ “Connect to Innovate,” *Government of Canada*, <https://www.ic.gc.ca/eic/site/119.nsf/eng/home>.

⁷⁰ “Canada's Digital Charter – Trust in a digital world,” *Government of Canada*, https://www.ic.gc.ca/eic/site/062.nsf/eng/h_00108.html.

and provided the flexibility to meet the evolving demands of the workplace.”⁷¹

What was heard

- Digital Skills/Literacy: it’s difficult to predict what jobs/skills of the future will be. Additionally, while not every job is a solely digital job, it was widely recognized that every job will have at least an element of digital skills needed.
- Upskilling and reskilling: it’s important to rethink how skills are viewed – important to look at an individual’s broad skillset as opposed to just credentials. People shouldn’t need to enrol in a whole program of study if they only need to upgrade a few skills.
- Access to talent: there is a shortage in many parts of the country of people with STEM education, and with critical soft skills – leadership, critical thinking, etc. This is particularly prominent in small and remote communities.
- Changing Labour Models: expectations about what a career trajectory and work week looks like are rapidly changing.

Unleashing innovation

The problem identified here is that “Canadian firms are slow adopters of new technology” which is problematic in terms of being competitive globally.⁷²

What was heard

- Connectivity for Economic Growth across Canada: connectivity for rural and remote communities continues to be a significant problem.

- Capacity building for technology adoption: many businesses are not aware of how they can apply digitalization and what benefits they could see.
- Building Partnerships: building partnerships across the country and between government, industry, post-secondary, or some combination thereof, will help build competitiveness.

Privacy and Trust

Because digitalization is moving so quickly, the government needs to make sure that privacy regulations are keeping pace.⁷³

What was heard

- Putting data to use for Canadians: ensure data collection is as representative as possible.
- Security: greater awareness is needed on how to protect Canadians.

AUSTRALIA’S TECH FUTURE

In 2018, the Government of Australia launched *Tech Future*, which is a policy meant to facilitate a “strong, safe and inclusive” digital economy. The vision of the policy is that “Australians enjoy an enhanced quality of life and share in the opportunities of a growing, globally competitive modern economy, enabled by technology.”⁷⁴ The emphasis throughout the piece is the importance of technology to the Australian economy: “Australia’s ongoing economic success depends on our ability to harness technological advances to improve existing businesses, create new products and markets, and enhance daily life.”⁷⁵

⁷¹ Innovation, Science, and Economic Development Canada, “Canada’s Digital Charter in Action: A Plan by Canadians, for Canadians,” *Government of Canada*, 2019, [https://www.ic.gc.ca/eic/site/062.nsf/vwapj/Digitalcharter_Report_EN.pdf/\\$file/Digitalcharter_Report_EN.pdf](https://www.ic.gc.ca/eic/site/062.nsf/vwapj/Digitalcharter_Report_EN.pdf/$file/Digitalcharter_Report_EN.pdf), 5.

⁷² Innovation, Science, and Economic Development Canada, “Canada’s Digital Charter in Action: A Plan by Canadians, for Canadians,” *Government of Canada*, 2019, [https://www.ic.gc.ca/eic/site/062.nsf/vwapj/Digitalcharter_Report_EN.pdf/\\$file/Digitalcharter_Report_EN.pdf](https://www.ic.gc.ca/eic/site/062.nsf/vwapj/Digitalcharter_Report_EN.pdf/$file/Digitalcharter_Report_EN.pdf), 8.

⁷³ Innovation, Science, and Economic Development Canada, “Canada’s Digital Charter in Action: A Plan by Canadians, for Canadians,” *Government of Canada*, 2019, [https://www.ic.gc.ca/eic/site/062.nsf/vwapj/Digitalcharter_Report_EN.pdf/\\$file/Digitalcharter_Report_EN.pdf](https://www.ic.gc.ca/eic/site/062.nsf/vwapj/Digitalcharter_Report_EN.pdf/$file/Digitalcharter_Report_EN.pdf), 9.

⁷⁴ Government of Australia, “Australia’s Tech Future: Delivering a strong, safe and inclusive digital economy,” *Government of Australia*, 2018, <https://www.industry.gov.au/sites/default/files/2018-12/australias-tech-future.pdf>, 6.

⁷⁵ Government of Australia, “Australia’s Tech Future: Delivering a strong, safe and inclusive digital economy,” *Government of Australia*, 2018, <https://www.industry.gov.au/sites/default/files/2018-12/australias-tech-future.pdf>, 6.

This policy is focused on providing an enabling environment for the Australian digital economy to thrive. To that end, the government committed to taking several actions relevant to rural digital economic development:

- “ensure education and training meets current and future needs, to help businesses take advantage of digital opportunities and leave no Australian behind
- facilitate investment in enabling digital infrastructure
- ensure regulatory frameworks are flexible, adaptable and fit-for-purpose
- deliver digital government services that are secure, fast and easy to use.”⁷⁶

The policy includes an emphasis on regulation because of the speed at which technological development moves.⁷⁷

NEW ZEALAND

New Zealand’s digital strategy was largely formed in the mid-2000s. *The Digital Strategy* of 2005, was followed by the *Digital Content Strategy* in 2007, and the *Digital Strategy 2.0* in 2008, which is most relevant. A digital government strategy was released in 2019.

We concentrate in this section of the report on New Zealand’s strategy because of the similarities between New Zealand and many Canadian provinces. N.Z. is relatively small (compared to its neighbours) and has significant proportions of its population living in rural areas. Additionally, N.Z. has a strong agriculture and other primary resource-based industries.

The Digital Strategy, 2005⁷⁸

Built into the 2005 budget, the strategy was focused on funding relevant digital projects. This includes intensive broadband development, seed funding and a fund to develop ICT skills in communities across New Zealand.

The strategy was based on three principles: connection, content and confidence. The first is literally broadband connection, the second is digital content (largely developed in the *Digital Content Strategy* 2007) and confidence refers to the competencies needed to operate in a digital environment.

Other elements of the digital strategy included an Advanced Network to connect post-secondary institutions, and a Cultural Portal, which was largely a way to connect different New Zealand cultural activities and promote them.⁷⁹

Creating a Digital New Zealand, 2007⁸⁰

Focuses on “making New Zealand visible” – it recognizes that the content people see and interact with has increasingly become part of the digital sphere.

The Digital Strategy 2.0, 2008

This iteration recognizes that digital is a part of life and the economy in some way. This strategy clearly uses the lens of, *how can digital technology help improve the most important parts of the country?* – this is a clearer emphasis on technology and digitalization as a means to an end than in some of the other strategies analyzed for this paper.

⁷⁶ Government of Australia, “Australia’s Tech Future: Delivering a strong, safe and inclusive digital economy,” *Government of Australia*, 2018, <https://www.industry.gov.au/sites/default/files/2018-12/australias-tech-future.pdf>, 50.

⁷⁷ *Ibid*, 48

⁷⁸ David Cunliffe, “Budget 2005: The Digital Strategy – Creating a digital future,” *Government of New Zealand*, <https://www.beehive.govt.nz/release/budget-2005-digital-strategy-%E2%80%93-creating-digital-future>.

⁷⁹ David Cunliffe, “Digital Strategy: Background questions and answers,” *Government of New Zealand*, <https://www.beehive.govt.nz/sites/default/files/Digital%20Strategy%20Backgrounder.pdf>.

⁸⁰ David Cunliffe and Judith Tizard, “Creating a Digital New Zealand: New Zealand’s Digital Content Strategy,” *Government of New Zealand*, 2007.

The three outcomes for digitalization are: healthy environment, high-value economy, and vibrant communities and culture. For each there are two “contributors to outcomes” and four “priorities for action,” which are shown in Table 3 below.

TABLE 3: NEW ZEALAND’S DIGITAL STRATEGY – USING TECH TO HELP MEET BROAD OUTCOMES⁸¹

OUTCOMES	CONTRIBUTORS TO OUTCOMES	PRIORITIES FOR ACTION
Healthy environment	Reduced carbon emissions	Use digital technology to reduce emissions across the economy
		Reduce emissions from digital technology
	Sustainable resource use	Use digital technology to enable more sustainable use of resources across the economy
		Encourage environmentally sustainable digital technology
High-value economy	Increased productivity across the economy	More effective use of digital technology
		Increase investment in digital technology
	New business models and opportunities	Use new digital business models
		Create new digital applications and content
Vibrant communities and culture	Locally grounded, globally connected communities	Support inclusive communities that offer a high quality of life
		Encourage civic participation
	Locally grounded, globally connected culture	Create and use professional/ commercial cultural and creative content in new ways
		Create and use everyday cultural and creative content in new ways

Each section – environment, economy, communities and culture – is broken down into specific actions, with a responsible government agency assigned to each, timing/indicators listed for each, and the status of the action (i.e. ongoing, expanded). For example (Table 4):

⁸¹ “The Digital Strategy 2.0,” *Government of New Zealand*, 2008, 12.

TABLE 4: EXAMPLE ACTIONS FOR INCREASING PRODUCTIVITY ACROSS THE ECONOMY⁸²

ACTIONS	RESPONSIBLE AGENCY	TIMING/INDICATORS	STATUS
Review how all government activities that require the management and verification of personal information (for example, issuing a driver's license) are undertaken, to make interaction with the government easier and more consistent for the public.	State Services Commission	Review completed by the end of 2009.	New
Develop and implement a National Education Network. Provide all education participants with access to a range of educational digital services and resources in a safe, secure, and integrated environment.	Ministry of Education	By 2012, every education organization – from early childhood education centres to universities – will have access to high-speed, reliable broadband.	Ongoing

Strategy for a Digital Public Service, 2019

Like *The Digital Strategy 2.0*, this strategy first identifies what the public service should be achieving, and how digitalization can help with this. From that, four outcomes are identified:

- Better results for New Zealand through a digital public service
- New Zealanders' experience with government improves
- A modern, agile and adaptive public service
- A strengthened Māori–Crown relationship⁸³

Lessons from New Zealand

One of the main reasons the New Zealand approach has been so successful is that it has been very intentional – each move taken has been a means to the end of improving quality of life and economic

opportunities for New Zealanders. The approach that New Zealand took in planning, particularly *The Digital Strategy 2.0* is instructive, because it started with the main goals of healthy environment, high-value economy, and vibrant communities and culture, and worked backwards from there. Additionally, there is an emphasis on government setting an example in the digitalization process, which seems to be one of the best ways to commit to and jumpstart the growth of digitalization in a given jurisdiction.

Takeaways for governments

A national strategy can sometimes look a lot like a provincial strategy if scaled to size and devoted to areas of provincial responsibility. Provincial governments can learn from and adapt what New Zealand has done over the last decade and a half. Government can jump start digitalization beginning with its own operations.

⁸² "The Digital Strategy 2.0," *Government of New Zealand*, 2008, 17-18.

⁸³ "Strategy for a Digital Public Service," *Government of New Zealand*, 2019, digital.govt.nz/assets/Digital-government/Strategy/Strategy-for-a-Digital-Public-Service.pdf, 15.

Community Digital Strategies

Digital strategies can be found in many communities but are most likely to be geared to large cities. This creates a challenge for governments wishing to develop a Rural/Remote Digital Strategy because the lived realities in rural/remote areas and urban centres are very different, particularly when it comes to digitalization. With that in mind, the community digital strategies selected for this report were smaller strategies or were Prairie communities.

Overall, we found that community digital strategies tend to fall into three categories:

- Designed to make government more digital
- Designed to promote economic development
- Designed to improve quality of life

Table 5 provides an overview of the community digital strategies consulted.

Designed to make government more digital

The three government focused strategies have similar tactics.

Northumberland County

Northumberland County (in southeast Ontario) developed a strategy in 2019 to have “a planned, coordinated effort to shape the introduction and use of new technologies in County workplaces and the community.”⁸⁴ This is part of a larger strategy to make the county overall an “intelligent community.”⁸⁵ Three areas of focus were developed, with each having 3-4 action items (Table 6).

TABLE 6: NORTHUMBERLAND AREAS OF FOCUS⁸⁶

WORKPLACE FOCUS	SERVICE FOCUS	COMMUNITY FOCUS
Build the digital infrastructure Modernize the workplace Transform lines of business	Expand community engagement Enhance digital service delivery Establish an Open Data Initiative	Address broadband challenges Establish a digital governance framework Pursue innovative opportunities Facilitate digital literacy

⁸⁶ Northumberland County, “Digital Strategy 2019,” iii.

⁸⁴ Northumberland County, “Digital Strategy 2019, SMARTnorthumberland: An intelligent community,” Northumberland County, August 2019, i.

⁸⁵ Northumberland County, “Digital Strategy 2019,” ii.

TABLE 5: COMMUNITY DIGITAL STRATEGIES

	NAME OF STRATEGY	DIGITAL STRATEGY OBJECTIVE	MAIN TACTICS	METHOD TO MEASURE SUCCESS
Calgary, Alberta	Calgary in the New Economy (2018)	Promote Economic Development	Pick industry clusters that have the greatest chance to succeed – start with them and go from there.	Track key indicators – including employment rate, % of labour force in specialized tech, etc.
Wellington, New Zealand	Wellington Digital Strategy & Action Plan (2011)	Promote Economic Development & Improve Quality of Life	3 focuses: make Wellington a place where people want to live, inspire knowledge sharing, make community leading place for digital activity	Track key statistics – access to broadband, number of so-called digital businesses, use of library/community technology
Squamish, British Columbia	Squamish Digital Strategy (2016)	Promote Economic Development & Improve Quality of Life	Five areas of focus: digital connectivity, community engagement, economic development, municipal services, and partnerships.	Will be identified later
Northumberland County, Ontario	Digital Strategy 2019	Digital Government	Ten action plans – a few specific actions associated with each plan, with each rated in terms of priority and length of time to achieve	No
Markham, Ontario	Digital Markham Strategy (2017)	Digital Government	Rely on creating deep understanding of current situation in Markham. From this established 12 goals – action items for each, some due in a year, some due longer term.	No
Vaughan, Ontario	City of Vaughan Digital Strategy 2.0	Digital Government	Based on Digital Strategy 1.0 and 1.5 – 1.0 was used to educate, 1.5 was a digital readiness assessment; 2.0 is a strategic plan with four focus areas.	No

Markham

Markham, Ont. released a Digital Community strategy in 2016. The strategy is based on thorough research done into the current digital state of Markham. The research determined Markham's "digital maturity" and compared it to other cities, providing Markham with a starting point in its goal of catching up to other cities.⁸⁷

Markham identified twelve priorities (grouped into four themes) and noted several action items for each. The action items are grouped into "quick actions for 2017" and "vision for 2018 and beyond."⁸⁸ Below, in Table 7, is an example of one theme, with four priorities and the associated quick actions for 2017 and visions for 2018 and beyond.

⁸⁷ City of Markham, "Digital Markham Strategy: Towards a connected and 'frictionless' city," *City of Markham*, November 2016, 7.

⁸⁸ City of Markham, "Digital Markham Strategy," 14.

TABLE 7: ENGAGING AND SERVING THE COMMUNITY THEME EXAMPLE – MARKHAM’S DIGITAL COMMUNITY STRATEGY⁸⁹

THEME	PRIORITY	QUICK ACTIONS FOR 2017	VISION FOR 2018 AND BEYOND
Engaging & Serving the Community	Continue to enhance the suite of fully integrated online and mobile service offerings	<ol style="list-style-type: none"> 1. Develop personas and journey maps to better understand users and their frustrations, and design a more cohesive experience 2. Refine existing digital services and implement opportunities for enhancements through existing (e.g. ePlan) or new projects 3. Update the Digital Services Roadmap (i.e. Portal Roadmap) for 2018 and beyond 	<ol style="list-style-type: none"> 1. Execute the priorities from the Digital Services Roadmap 2. Integrate Customer Relationship Management System city-wide so all user interactions are tracked and accessed in a single system 3. Explore using predictive (Artificial Intelligence) systems to further enhance personalization on digital channels
	Build on the library as a centre of excellence for digital literacy	<ol style="list-style-type: none"> 1. Incorporate Digital Literacy plan into the existing library technology strategy to continue to bridge the digital divide 2. Create a collaboration hub proof-of-concept in the new SE Community Centre & Library, including state-of-the-art digital infrastructure and open-concept design spaces 3. Develop communication strategy to attract citizens to the collaboration hub 	<ol style="list-style-type: none"> 1. Roll out new Digital courses and continue to increase digital maturity in the delivery of library services 2. Host a collaborative design session in a hub and allow the community to help optimize the design of the next collaborative hubs 3. Build more collaboration hubs in city spaces, such as community and recreation centres, tailored to the user groups in that area
	Promote collaboration through digital tools	<ol style="list-style-type: none"> 1. Develop a standard and mechanism for digital collaboration and engagement 2. Procure the tools the city will engage its population on, such as PlaceSpeak 3. Develop content strategy to manage the deployment of content on specific channels 	<ol style="list-style-type: none"> 1. Pilot community collaboration in online discussion using digital platforms (users cannot participate anonymously) 2. Explore using sentiment analysis to proactively manage community expectations and criticisms
	Continue to develop Markham’s role as a leader in Digital Democracy	<ol style="list-style-type: none"> 1. Establish a policy and marketing plan for election day (not just advanced) voting in the 2018 election 2. Explore emerging technologies that could enhance the digital voting experience 	<ol style="list-style-type: none"> 1. Execute on the plan for full online voting on election day in 2018, explore the outcome and recommend options for 2022 2. Analyze public sentiment on their experience using the new technology 3. Hold a summit and invite other municipalities to share the experience of online voting and initiate a blog of the experience

⁸⁹ City of Markham, "Digital Markham Strategy," 14-17.

It's important to note that the population of Markham is approximately 340,000. While many of the goals the strategy has in mind are not suitable for a province as spread out and rural as Ontario, the approach is valuable in and of itself. There may also be some elements that can be applied to the whole province. (For example, looking at the actions in the table above, a digital voting strategy, and incorporating more digitalization into provincial libraries).

Vaughan

Vaughan, Ont. created its strategy because “customers expect government in the digital age to be better, faster and easier to interact with.”⁹⁰ The strategy is designed to cover five years, namely 2017-2021, with a number of “quick wins” designed to take place in the first two years.⁹¹

Four focus areas are included in the strategy:

- An engaged community (through the use of digital technology)
- Citizens can do business with the city through digital channels
- Be Open (transparent, open data to community, and provide open/free WiFi access)
- Internal government digital transformation⁹²
 - “Adopt modern collaboration capabilities, including Office 365, Skype for Business to support more flexible, remote working”⁹³

The strategy also includes a “who does what” plan. All relevant parts of city government are included, and their roles and responsibilities are described.

Improve Quality of Life and Economic Development

The strategies created in Wellington and Squamish have economic development and quality of life as the main drivers.

Wellington, New Zealand

The overall aim of the Wellington Digital Strategy is that “Wellington will be globally recognized as a creative digital city.”⁹⁴ Three strategies were developed to support this overall aim, with each having five action items. The strategies focus on attracting digital talent:

- Make Wellington the place where talent wants to live
- Inspire shared knowledge and development of ideas and creativity
- Make Wellington a leading place for digital activity⁹⁵

The strategy focuses more on Wellington improving “creative digital” capacity rather than simply “digital.”

This strategy is the most long-term community digital strategy we found – it is meant to support Wellington’s development over 30 years; that being said, the strategy is scheduled to be reviewed every two years.⁹⁶

District of Squamish

The Squamish, B.C. digital strategy reflects the fact that the town, with a population of under 20,000, is much smaller than many other communities with these kinds of strategies. For this reason, it is a useful community digital strategy for provinces and small municipal districts to consult.

The strategy was developed by the District of Squamish to determine how to “better leverage technology to meet the growing social, economic and environmental needs and desires of its citizens.”⁹⁷ It was driven by the realization that technology can be a useful tool to lower costs of government services, and to provide solutions to community problems.

⁹⁰ City of Vaughan, “City of Vaughan Digital Strategy 2.0,” 2017, 5.

⁹¹ City of Vaughan, “City of Vaughan Digital Strategy 2.0,” 2017, 14.

⁹² City of Vaughan, “City of Vaughan Digital Strategy 2.0,” 2017, 26-35.

⁹³ City of Vaughan, “City of Vaughan Digital Strategy 2.0,” 2017, 36.

⁹⁴ Philippa Bowran, “Wellington Digital Strategy & Action Plan,” *City of Wellington*, September 2011, 4.

⁹⁵ Philippa Bowran, “Wellington Digital Strategy & Action Plan,” *City of Wellington*, September 2011, 4.

⁹⁶ Philippa Bowran, “Wellington Digital Strategy & Action Plan,” *City of Wellington*, September 2011, 7.

⁹⁷ Digital Squamish, “Squamish Digital Strategy,” *Digital Squamish*, December 2016, 5.

The District also recognizes that, if it wants to keep young people and tech professionals in the community, they need to develop better digitalization within the community. Meanwhile, there are people who risk being left behind in this digitalization process (i.e. people without digital skills or experience – seniors, lower income households, homeless community members, etc.)⁹⁸

One of the most interesting things that resulted from the research and community consultation the District did as a list of “potential barriers to achieving digital maturity.” Further, non-digitalization strategies may be necessary to help with these barriers (i.e. an Affordable Housing Strategy).

Potential barriers to Squamish achieving the goal of digital maturity:

- The anticipated cost savings for a business operating in Squamish or a resident living in Squamish are not realized.
- The availability and cost of commercial and residential property is under strain.
- Squamish must compete with wages in the Lower Mainland to attract and keep workers.
- The availability of advanced technical talent is challenging for most municipalities.
- Squamish may not attract those who do not regard outdoor recreation as being important.
- Certain areas in Squamish remain technologically under-served (primarily residential).
- The development of new commercial and residential properties isn't keeping up with demand.
- Cost of digital infrastructure and services compared to those provided in other Lower Mainland municipalities is higher.⁹⁹

From research and consultation, five key areas of focus were identified:

-
- 01 Digital connectivity:** “the infrastructure of Squamish’s digital network, and access to the tools needed to connect devices, objects and people, is the foundation of a digitally mature community.”¹⁰⁰

 - 02 Engagement:** “engagement amongst stakeholders, partners, businesses and citizens is necessary to reduce the digital divide, and guide and inform community decisions including action plan initiatives.”

 - 03 Economic Development:** “In an effort to improve the quality of living for all of its residents and grow its non-residential tax base, Squamish should harness technology and continue to support the growth of all sectors, including the digital sector.”

 - 04 Municipal Services:** “Using technology to create efficiencies in the type of services it provides and the delivery of these services is one way the District can steward taxpayer money, engage the community, and achieve its community vision.”

 - 05 Partnerships:** “Building linkages within the technology community (both in Squamish and beyond) and between governments, businesses, non-profit organizations and entrepreneurs can help expand the reach, cost savings and overall benefits of all of the recommended initiatives.”¹⁰¹

Initiatives are identified, all of which are connected to at least one of the key areas of focus. Some of these initiatives are purely digital, but many are

⁹⁸ Digital Squamish, “Squamish Digital Strategy,” *Digital Squamish*, December 2016, 9-10.

⁹⁹ Digital Squamish, “Squamish Digital Strategy,” *Digital Squamish*, December 2016, 12.

¹⁰⁰ Digital Squamish, “Squamish Digital Strategy,” *Digital Squamish*, December 2016, 22.

¹⁰¹ Digital Squamish, “Squamish Digital Strategy,” *Digital Squamish*, December 2016, 23.

only partly so. Initiatives include improve access to affordable and suitable employment lands and spaces; improve the variety and quality of the District's digital communication tools to grow and improve engagement with residents and businesses; and build a community portal.¹⁰²

Finally, the strategy notes how a successful strategy will impact varying groups of people in Squamish. For example:

A local business that wants to expand in Squamish will be able to:

- Access online business license renewals and payments.
- View online history of property taxes paid and owing.
- View GIS-based location coordinates, boundaries, infrastructure (gas, water etc.), expected or upcoming public works in the vicinity, etc.
- View online building and development permit applications and processing status updates.

A resident who is not yet digitally connected will be able to:

- Visit the library and sign up for an introductory course on how to use a computer, access the Internet, and set up and use an e-mail account. Learn about basic safety and Internet browsing tactics.
- Set a goal to learn how to pay municipal taxes online from the District of Squamish, and how to print off a paper receipt.
- Learn how to submit a comment or send a direct message to the District via one of their social media channels (such as Facebook).

A resident student with digital aspirations will be able to:

- Sign up for a specific course on coding or application development at their school and learn about safety and best practices for data protection.
- Set a goal of learning how to develop an application that could be shared and used by people in Squamish. Perhaps this can be a part of a school project.
- Enquire about internship or job-shadowing opportunities with the District or with a business in the digital sector in Squamish.
- Uses the capped, free Wi-Fi in municipal buildings and around Downtown Squamish.

A person who loves the Squamish lifestyle (this may apply to several of the target groups) will be able to:

- Access Recreation Centre bookings easily on their mobile device and book and pay for a class from their mobile device.
- Use a centralized GIS tool to see trail, rock, water and other outdoor recreation conditions in the area.
- View the live webcams and video feeds to see about weather, crowds, hiking, biking and climbing conditions; and upload information/photos to share with others.¹⁰³

Economic Development

Calgary

The Calgary Strategy, *Calgary in the New Economy*, is not a purely digital community strategy; it is an economic strategy which places digitalization at the forefront, because it is increasingly shaping the Canadian and global economy. Developed in 2017, this strategy builds on the 2013 strategy because many of the things that define the digital economy – like the Internet of things and clusters – either non-existent or not well known then.¹⁰⁴ Additionally, it is argued that many of the skills needed in today's economy were nonexistent in 2013.¹⁰⁵

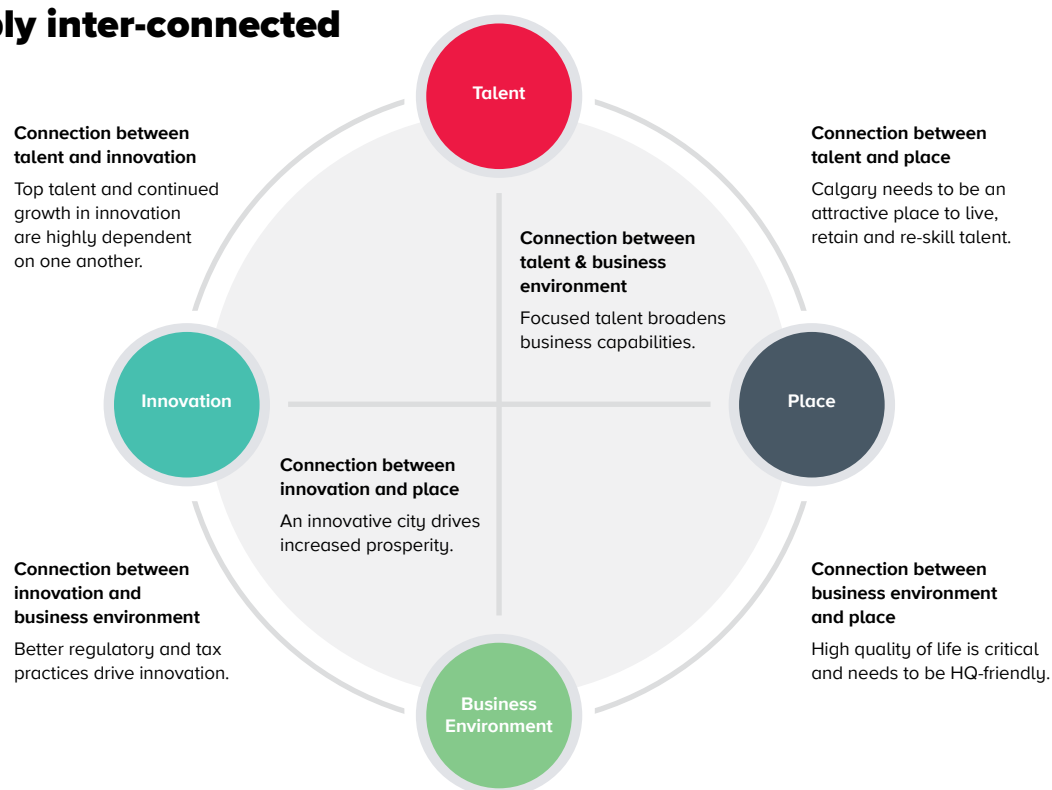
¹⁰² Digital Squamish, "Squamish Digital Strategy," *Digital Squamish*, December 2016, 25-26.

¹⁰³ Digital Squamish, "Squamish Digital Strategy," *Digital Squamish*, December 2016, 29-30.

¹⁰⁴ Steve Allan and Adam Waterous, "Calgary in the New Economy," *Calgary Economic Development*, 7.

¹⁰⁵ Steve Allan and Adam Waterous, "Calgary in the New Economy," *Calgary Economic Development*, 15.

Four areas of focus are deeply inter-connected



Source: <https://www.statista.com/statistics/290521/>

TABLE 8: SELECT INITIATIVES FROM CALGARY'S ECONOMIC STRATEGY

AREA OF FOCUS	INITIATIVE	DETAILS	TIMELINE
Talent	Create Canada's largest talent accelerator	<ul style="list-style-type: none"> Expand work-integrated learning programs Collaborate with post-secondary institutions and other providers to design programs aligned with business workforce requirements Enhance program access to diverse communities Pilot/scale nimble short-term programs to re-skill workers 	Immediate
Innovation	Accelerate growth through attraction, advocacy, and trade	<ul style="list-style-type: none"> Attract investment and companies to fill gaps in our innovation ecosystem Advocate for government venture capital investment and tax credits Build the connections and reach of Calgary's tech companies 	1-5 years
Business environment	Develop Calgary as a living lab	<ul style="list-style-type: none"> License and share The City of Calgary data on a large scale Open City infrastructure to create wireless (5G ready) zones with industrial partners Extend dark fibre footprint of technology and innovation to provide solutions to city challenges 	5+ years

The strategy picks four areas of focus: talent, innovation, business environment and place.

For each of these areas of focus there are a few key initiatives, with specific actions and timeframes associated. Below are the most relevant for this paper's purposes (Table 8).

Finally, Calgary's strategy is notable because of the clear effort made to find ways to measure progress using available data. This includes the employment rate, net migration, per cent of workforce in STEM, quality of life survey and net change in number of businesses. Using this data, Calgary will be able to track its progress in its broad goal of growing the economy, and to adjust where needed.

Takeaways for governments

There are a wide variety of ways to approach a community digital strategy, building explicitly or implicitly on the community's strengths in the digital sphere. An excellent element to include in any digital strategy is, like Squamish, to also look at weaknesses and potential barriers to implementation.

Strategies should include a vision for the end goal. Again, Squamish's approach is particularly useful because it focuses on what the community needs overall, and how digital fits into that – not just digital for the sake of digital. It also looks at different groups and how they can be positively impacted by a digital strategy.

Nelson, British Columbia

Nelson, B.C. (population c. 10,500) is renowned for its digital prowess, especially for such a small, Kootenay mountain community. It was named a Smart21 Community in 2017 by the Intelligent Communities Forum, a prestigious list to be included in – and Nelson was by far the smallest community on the list. But what makes Nelson unique is there has been relatively little government input in making the city such a tech phenomenon: it is remote, but it also sits in a beautiful location between Kootenay Lake and the Selkirk Mountains.

It hosted key one-day events to propel thinking in Nelson, before developing a strategy. In 2013, it installed broadband throughout downtown while roadwork was being completed. In 2014, it held a one-day Community Economic Forum, which brought up the idea of trying to compete for being a Smart Community. The community identified a number of strengths to build on, including more broadband infrastructure; Selkirk College for tech education; Nelson Tech Club for peer learning and knowledge sharing; and, Nelson Civic Theatre Society to strengthen film and screen-based industries in the region.

In 2015, the city hosted an Intelligent Nelson Strategic Doing event which helped to identify projects to help the community succeed in a digital world – this event was attended by industry, tech workers, entrepreneurs. Initiatives emerged from this event, including a web application development program at Selkirk College, and a feasibility study for a Nelson Innovation Centre (a provincial grant of \$100,000 will help create the centre).

Nelson is a small community and as such has limited resources. One of the ways it has tried to get around this is by partnering with other communities of similar sizes and goals, such as Telluride Colorado.¹⁰⁶

The number of tech companies operating at least a branch office in Nelson has grown dramatically in the last several years. Besides the tech community and needed infrastructure, what draws companies in is the quality of life and relative affordability of living in Nelson.¹⁰⁷

¹⁰⁶ Kevin McCormack, "From Broadband to the Smart21 Community List," *BC Ideas Exchange*, https://www2.gov.bc.ca/assets/gov/employment-business-and-economic-development/economic-development/economic-development-success-stories/nelson-tech-friendly-community/bcix-story_nelson-tech_19july18-final.pdf.

¹⁰⁷ Derrick Penner, "Vancouver tech firm opens Nelson outpost as attraction in hot job market," *Vancouver Sun*, June 12, 2019, <https://vancouversun.com/news/local-news/vancouver-tech-firm-opens-nelson-outpost-as-attraction-in-hot-job-market/>.

Digital Cottage Industries

Cottage industries have long been a mainstay of the global economy. They were developed in Victorian times, when women supplemented their income by doing piece work, like sewing at home for a clothing or textile manufacturer.¹⁰⁸ Cottage industries are those that are done from the home, are often manufacturing based, and are often informal industries.

The advent of digitalization has created a “global renaissance in cottage industries.”¹⁰⁹ This includes selling items on popular sites such as Etsy, eBay, and Kijiji, or selling services online, such as freelance writing. Below is an illustration of a cottage industry enabled by digital technology that can have a significant economic impact, and in which Canadians are already involved.

There are a growing variety of jobs for digitally skilled workers which are creating digital cottage industries.

Micro-tasking

Gig workers, often working from home or in shared workspaces are hired on short – sometimes micro contracts – to do digital piece work. Websites such

as *Clickworker* and *Mechanical Turk* are matching people with the right skills to employers who have broken jobs into micro-tasks in data collection and processing. According to the Clickworker website, there are 1.9 million Clickworkers.¹¹⁰ These workers are doing a variety of tasks including web research, tagging web content to aid in web-based searches, and teaching Artificial Intelligence (AI).¹¹¹ These types of jobs do not require any formal qualifications – individuals can register as workers through the platform websites and are matched to work as it becomes available.

AI requires humans to teach it to process data, speak, see and drive. For instance, a self-driving car needs to be able to identify a stop sign. Humans are hired to tag, or label, the millions of images, videos and photographs, of stop signs that are then fed into the algorithms that run the AI.¹¹² Each task – the tagging of a photo – may pay only a few cents, but people working from home can make up to \$14 per hour doing this work. These jobs are also available through *Clickworker* and other similar platforms.

¹⁰⁸ Palmer, Maija. “Digital cottage industries thrive.” *Financial Times*, May 24, 2009, <https://www.ft.com/content/d64c97fa-48a4-11de-8870-00144feabdc0>.

¹⁰⁹ Aling, Mike. “Digital Cottage Industries.” *Landscape into Architecture* 83, 3 (April 2013): 102.

¹¹⁰ Clickworker, <https://www.clickworker.com/>.

¹¹¹ “How Microtasking Helps Optimize AI-Based Search – in Media, eCommerce, and More,” *Emerj*, December 13, 2018, <https://emerj.com/partner-content/how-microtasking-helps-optimize-ai-based-search/>.

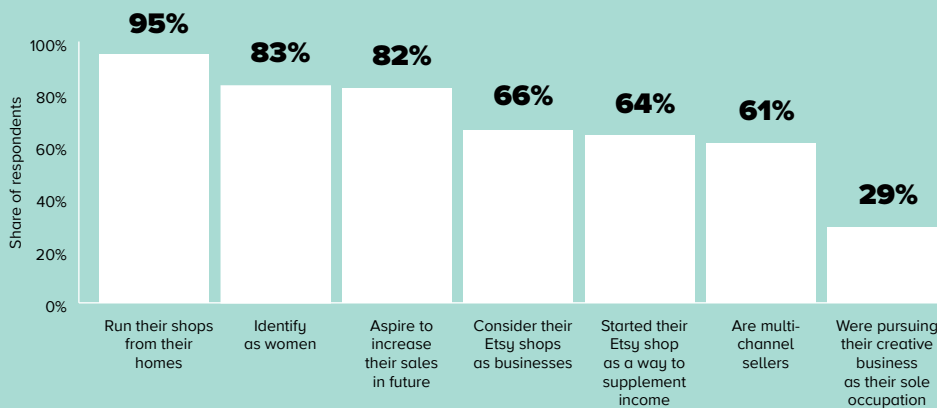
¹¹² Matthew Huston, “The Future of AI Depends on a Huge Workforce of Human Teachers,” *Bloomberg*, September 7, 2017, <https://www.bloomberg.com/news/articles/2017-09-07/the-future-of-ai-depends-on-a-huge-workforce-of-human-teachers>.

Etsy

Etsy is an online marketplace, an intermediary between customers and sellers of either handmade or vintage items. Launching in 2005, the annual gross merchandise sales volume has been steadily increasing from US\$170,000 in 2005 to US\$4.7 billion in 2019. There are 2.5 million active sellers on Etsy.¹¹³

Statistically, rural people in the United States are more likely to sell items on Etsy than own another small business: in 2016, 28 per cent of sellers on Etsy came from rural areas, whereas only 18 per cent of business owners came from rural areas.¹¹⁴

SELF-IDENTIFICATION AND MOTIVATION OF ETSY SELLERS AS OF 2019¹¹⁵



Source: © Statista 2020 (need to add source here)

While many use the site as an income supplement, it can also have a bigger economic impact. For example, the *New York Times* profiled a woman who employed 25 local women to help her make products for her Etsy page.¹¹⁶ Many communities are listed on Etsy as having at least one seller. To be able to sell on Etsy, a Canadian needs a reliable Wi-Fi connection and the digital skills needed to navigate the site before the product can be sold.

¹¹³ Palmer, Maija. "Digital cottage industries thrive." *Financial Times*, May 24, 2009, <https://www.ft.com/content/d64c97fa-48a4-11de-8870-00144feabdc0>.

¹¹⁴ Aling, Mike. "Digital Cottage Industries." *Landscape into Architecture* 83, 3 (April 2013): 102.

¹¹⁵ Clement, J. "Etsy – Statistics & Facts," *Statista*, March 3, 2020, <https://www.statista.com/topics/2501/etsy/>.

¹¹⁶ Tabuchi, Hiroko. "Etsy's Success Gives Rise to Problems of Credibility and Scale," *New York Times*, March 15, 2015, <https://www.nytimes.com/2015/03/16/business/media/etsys-success-raises-problems-of-credibility-and-scale.html>.

Cyber security

There is a growing need for cyber security expertise. White hat hackers – the good guys – can inspect a firm’s technology systems to make sure they are safe from the black hat hackers – the bad guys. This is akin to checking the locks on the doors to the applications in use by a firm, working as a kind of virtual security guard. This work is known as penetration testing and with the right equipment and training, can be done remotely. Clients determine which level of security they need – from a basic check that the doors are locking properly to making sure that absolutely no one can get in. Workers can be hired by larger companies and deployed to work with clients or can build their own clientele.

Qualifications for cyber security work vary depending on the level of security the client needs. And it pays well. A well-trained, full time penetration tester can earn \$70,000. In Canada, many post-secondary institutions and private training providers such as Retrain Canada and LinkedIn Learning offer the training online. The sought-after offensive security certified professional (OSCP) certification is a third-party certification offered through the U.S., but generally accepted in Canada.¹¹⁷ OSCP training is offered online, can cost about \$1,500 and requires advanced digital skills but it can lead to a rewarding home-based career. There are also specific connectivity requirements to do this work, including access to a VPN (virtual private network); once again this work depends on the availability of broadband.

Customer service

Customer service, including over the phone and online chat, can also be performed at home for firms that are located anywhere in the world – when language is not a barrier. These jobs provide support and resolution of routine problems regarding products or services. Some large companies hire home-based workers for their own customers, others hire for a variety of clients. After the required training and ongoing support, these jobs can pay \$45,000 or more per year.¹¹⁸

VR and AR

Finally, there is growth in the world of designing, and developing virtual reality (VR) and augmented reality (AR) tools and games. Among other uses, VR and AR are becoming important training tools especially for hands-on and experiential learning. Because training this way can be done anywhere, anytime, rural and remote learners are benefitting too. Once trained, development of VR and AR can be done remotely, and pays very well.

It cannot be overstated that this kind of work is all dependent on having access to reliable, high-speed Internet capacity and modern equipment.

Cottage industries – clusters of workers working in similar jobs from a home base can be a solution to employment for people in rural and remote areas. However, there is a drawback. The community’s business tax base does not increase in the same way it would if more small and medium-sized enterprises employing the workers set up shop in the area.

One way to overcome this drawback is to actively recruit employers by ensuring that they can draw from a qualified talent pool. Canada West Foundation has promoted a competency-based solution to achieve employer recruitment. This involves working with potential employers to understand exactly what their skill requirements are – and then to help build those skills in the local workforce. This approach to economic development has been used successfully in East Kentucky. See our op-ed, *To sell your city to new employers, sell your workforce*, published in the Calgary Herald on March 7, 2020.¹¹⁹

Takeaways for governments

With the right equipment and training, rural and remote Canadians could work out of their homes as employees of companies which hire for a variety of digital jobs. The government could play a role in attracting employers to hire people in rural and remote communities. For the more entrepreneurial, opportunities exist to develop home-based digital consulting work. As always, this is dependent on reliable broadband Internet connectivity.

¹¹⁷ “Skills Training for the Digital Economy,” *Retrain Canada*, <https://www.retraincanada.com/>; Steve Maciejewski, “Cybersecurity Awareness: Security Overview,” LinkedIn, <https://www.linkedin.com/learning/cybersecurity-awareness-security-overview>.

¹¹⁸ Workopolis.com

¹¹⁹ Janet Lane, “To sell your city to new employers, sell your workforce,” *Calgary Herald*, March 7, 2020, <https://cwf.ca/research/publications/op-ed-to-sell-your-city-to-new-employers-sell-your-workforce/>.

Conclusions & Recommendations

A final note regarding the pandemic:

During the self-isolation imposed during the COVID-19 pandemic, individuals, especially those who are new to working from home, are building new digital skills out of necessity. Once the pandemic is over, it will be useful to examine how much of this new skill is retained, and how many people continue to, at least occasionally, work from home. Once employers can determine if the productivity level from this mode of work is satisfactory, they may be more willing to incorporate it into regular routine and be more willing to hire people who live remotely. Of the many impacts of the pandemic, the impact on the general increase in use of digital technology will be notable. Adoption of digital technologies in health, education and government services were greatly accelerated.

During the pandemic, services that were believed to be best delivered in-person, such as health care and education have been delivered well through technology to customers within reach of that technology. As technology infrastructure is built out to more of the province, quality services will become more available to the rural population and some of the disparity in service availability will be decreased.

This study has examined a variety of strategies from across Canada and parts of the world to inform governments at all levels how it might develop a rural digital economic strategy.

Analysis of the strategies and initiatives presented in this report leads the authors to the following conclusions and recommendations:

The strategy should be developed with support from all levels of government

One commonality of the strategies and initiatives studied for this report is that they were devised through engagement with the community or region involved and, in some cases, by people in the community or region itself – with support as required from a higher level of government.

As examples, the Klukenah Network (K-Net) in Northern Ontario, the Rural Innovation Lab in New Zealand, the Markham, Ont. digital community strategy and Squamish B.C.'s digital strategy all involved local people to determine the needs of the community and from them the goals and activities of the strategy or initiative.

Canada has strong and resilient rural communities with experienced local governments, including the Chiefs and councils of First Nations, who are closest to and have the best understanding of their community's strengths, challenges and needs. This report shows that given the opportunity, different communities will choose different digital strategies in response to their needs. Strategies may range from

improving access to learning and health care, to opportunities for working professionally from home, to increasing the digital capacity of businesses, including farms, and more.

Recommendation

That the overarching goals for a rural digital economic strategy be developed at the provincial or national level. As an example, New Zealand chose healthy environment, high-value economy and vibrant communities and culture as its three main goals. The goals of any strategy will be informed by engagement with local residents, their own perceived needs, this report, and the work of other researchers.

Any of the goals and objectives of the provincial and local strategies will depend on both the improvement of digital skills across the country, and as has been noted repeatedly, the expansion of broadband internet capacity. Some activities designed to achieve these strategies will require that government review and perhaps change regulations.

Local strategies

Goals of local digital strategies will vary in response to three stages of community readiness. While some communities may be ready to incorporate all of these strategies, others may choose to work on them sequentially.

Better communication and access to government services at all levels

For the most remote communities and those with few opportunities for economic development, the goals of an initial digital strategy may be better access to provincial and federal government services, such as general information, income supports, taxation, and social and justice services. Within the communities themselves, strategies may be geared to enabling better local government services and communications through technology. For people living within the communities, the initial strategies may be to provide access to less expensive and more interactive tools that will allow better communication with family members away from home.

K-net, in Northern Ontario, is an example of an Indigenous led initiative that helped communities build access to the infrastructure required and then expand services to community members. (See Page 18.)

Improve quality of life

When government services and better communication are more readily available, people will already experience an improvement in their quality of life. However, more services and experiences can be provided digitally.

→ *Education and training opportunities*

Distance and online learning at all levels are made possible. Learning providers have dramatically improved their capacity to deliver learning using technology throughout the pandemic period. These capacities will likely remain in place after the pandemic is over. This will be especially advantageous for rural and remote residents.

→ *Telehealth*

Rural and remote areas with adequate bandwidth can benefit from medical consultations, including diagnosis and treatment, and mental health therapies.

→ *Culture*

A vibrant culture is possible without technology as any rural person will attest. However, cultural life can be enhanced through technology – access to libraries, virtual tours of art galleries and museums, and streaming of theatrical performances to name a few, (see N.Z. Page 27).

→ *Global connections and local civic participation*

Digital technology enables connection to the world – from news and current events to armchair travel and investment in communities across the world. Community engagement and sharing is also enhanced. (Squamish, B.C. Page 34.)

Increase economic development

Economic development is made possible through increased access to all the benefits of digital service delivery. When workers have improved skills and reliable internet capacity it is possible to improve the productivity of existing employers, to attract new employers who use higher levels of technology, and to encourage entrepreneurship in the community. The Centre on Rural Innovation in Vermont (Page 21), New Zealand (Page 27) and Squamish, B.C. (Page 33) had some targeted activities in this area.

Another benefit that comes from improved skills and access to broadband is that people may be able to work from home, either as an employee or a contractor – using a digital labour platform or other cottage industry type work. (See Page 39.)

Any local digital economic strategy will have similarities to strategies in other communities but will have subtle differences that reflect the capacity of the community. Ensuring that the maxim, “Nothing about us, without us,” is in place for communities in rural and remote areas of Canada will enable each community and region to develop the strategy, or series of strategies, that is right for them in that moment and as its needs evolve.

Recommendation

That the provinces lay the groundwork for local communities to engage in developing their own digital economic strategies and be prepared to offer assistance at every step of the process. Having provincial assistance in helping to facilitate the discussions, providing information, identifying what is possible and what might take a little longer, and helping to overcome any barriers will be critical for community success. Larger communities in closer proximity to the cities may decide to attempt to build a strategy to achieve all three kinds of objectives outlined above. Smaller, more remote communities may choose to progress more slowly.

Digital skills

Improving access to government services, improving quality of life and increasing the availability of good jobs are all important to Canada’s rural and remote area prosperity. To use technology well for personal or professional use, and given the increasing digitalization of work, Canadians need to improve their digital skills.

At the time of the 2016 Census, while 85 per cent of the Country’s workforce had at least a high school diploma or equivalent, almost 50 per cent of the workforce in 2012 (as measured by PIAAC, the last time these skills were measured) had levels of literacy and numeracy skills below what is needed to do virtually every job well and to learn new skills. Too many Canadians had poor results for problem solving using technology (the language used to refer to digital skills in PIAAC).

Recommendation

That the types and levels of digital skills held by people in rural Canada and the skills needed for their jobs are identified and the workforce is provided with opportunities to fill the gaps in their digital skills. It will be necessary to assist many people to build their learning to learn skills first.

Local literacy and adult learning organizations, the K-12 system and the post-secondary system have mandates to both assess and build skills. While learning is done best locally, if in rural and remote areas a local presence is not possible, content can be provided through online and distance education (broadband permitting). This type of learning is most successful if educational supports for learners are provided locally. Employers can use the Canada Job Grant to help fund digital skills training. Pre-employment and retraining programs funded through the federal government Labour Market Partnerships should also include a digital skills component, where appropriate.

Broadband Infrastructure

The federal budget of 2019 announced funding to ensure that 100 per cent of the country has access to high speed internet by 2030. Both of these are positive steps, but rural Canada cannot wait until 2030.

Recommendation

That to improve services, attract employers and keep rural and remote areas thriving, improved access to broadband infrastructure be built as quickly as possible. Existing plans to do this should be accelerated by partnering among government departments and communities.

Regulations

Regulations impede some innovations. For example, during the pandemic, face to face interactions were discouraged. However, physicians who made calls to their patients were, until months into the pandemic, working from a fee schedule that priced this service less than in-person visits. Governments reacted to these kinds of disruptions much more quickly during the pandemic than normal fee schedule and service policy.

Recommendation

That governments at all levels examine the regulatory implications of any proposed activities associated with digital strategy goals and make appropriate changes to enable the activities to be successful. Adoption of digital aids to living and working can happen very quickly; it will be important for any strategy to keep up with the technology, so that its digital economic strategy provide the expected benefits.

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Carolyn Graham

Diane Gray

Nancy Hopkins, Q.C.

Edward S. Kennedy

Brenda Kenny

Blair Lekstrom

Charles N. Loewen

Steve MacDonald

Jack Mintz

Doug Moen, Q.C.

Mariette Mulaire

Robin Silvester

Paul Vogt

Ron Wallace

James Wilson

Deborah Yedlin

THE HUMAN CAPITAL CENTRE
CHAMPIONS A WEST THAT PROSPERS AS ITS PEOPLE
REACH THEIR FULL POTENTIAL.

BASIC COGNITIVE AND DIGITAL SKILLS ARE
PREREQUISITES FOR LIVING LEARNING AND WORKING
TO OUR FULL POTENTIAL.