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The Peaks and Valleys of Connection: Lessons from the Scottish Highlands and Islands

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The Peaks and Valleys of Connection: Lessons from the Scottish Highlands and Islands

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Abstract

Limited by incoherent government policies towards rural connectivity and development, rural communities across Canada, especially in mountainous regions, struggle to access and implement innovative technologies and strategies to address local development needs. Meanwhile, the European Union (EU) and the United Kingdom (UK) are experimenting with policies and pilot projects implementing the Smart Village approach to address rural connectivity. This research investigates how the Smart Village approach has been deployed in the EU and UK to support rural development in mountainous regions. Through an analysis of EU and UK policy documents tied to the creation of the Smart Village concept, the Highlands and Uplands region of Scotland was identified as the case for this research. Semi-structured interviews were conducted with local leaders and organizations to examine the research question. The research demonstrates the intersection of geography, technology, and policy in rural development, providing several transferable lessons for Canadian policy makers and mountainous communities seeking enhanced development outcomes through place- and participatory-based strategies.

Keywords: Smart Villages, broadband, connectivity, rural development, Scotland

Les hauts et les bas de la connectivité : leçons tirées des Highlands et des îles écossaises

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Résumé

Face à des politiques gouvernementales incohérentes en matière de connectivité et de développement rural, les communautés rurales du Canada, particulièrement en régions montagneuses, peinent à accéder aux technologies et stratégies innovantes et à les mettre en œuvre pour répondre à leurs besoins de développement locaux. Parallèlement, l'Union européenne (UE) et le Royaume-Uni expérimentent des politiques et des projets pilotes appliquant le concept de « village intelligent » pour remédier au problème de connectivité rurale. Cette recherche examine comment ce concept de « village intelligent » a été déployé au sein de l'UE et du Royaume-Uni pour soutenir le développement rural dans les régions montagneuses. L'analyse des documents politiques de l'UE et du Royaume-Uni relatifs à la création du concept de « village intelligent » a permis de cibler la région des Highlands et celle des Uplands d'Écosse. Des entretiens semi-structurés ont été menés auprès de responsables et d'organisations locales afin d'explorer la question de recherche. Cette étude met en lumière l'intersection de la géographie, de la technologie et des politiques publiques dans le développement rural, et propose plusieurs enseignements transposables aux décideurs politiques canadiens et aux communautés montagneuses qui souhaitent améliorer leurs résultats en matière de développement grâce à des stratégies territoriales et participatives.

Mots-clés : villages intelligents, haut débit, connectivité, développement rural, Écosse

1.0 Introduction

What does it mean to be “Smart” in the context of rural development? In development studies, the term is applied to several concepts, including the integration of digital tools and mass data collection to inform urban design (Cvar et al., 2020; Suartika & Cuthbert, 2020; Zavrtnik et al., 2020). Access to Information and Communication Technologies (ICTs) is crucial for citizens to facilitate sustainable development (Díaz-Roldan & Ramos-Herrera, 2021; Rajabiun, 2020; Zavrtnik et al., 2018, 2020). For rural areas, the application of ICTs can have transformative effects, accelerating the spread of information, enhancing the delivery of essential services, and expanding access to decision makers (Stojanova et al., 2021; Weeden & Kelly, 2021; Zavrtnik, 2020). Rural applications of Smart development approaches are diverse and show the potential to enhance development outcomes in rural spaces. However, the potential benefits of digital integration vary depending on where one lives (Adamowicz, 2021; Anastasiou et al., 2021; Spicer et al., 2021).

Gaps exist between urban and rural regions, and between rural spaces, in their ability to access reliable ICT infrastructure and apply Smart strategies in local development practice (Hambly & Rajabiun, 2021; Weeden & Kelly, 2021; Worden & Hambly, 2022). These ICT infrastructure and knowledge deficits, or “urban-rural digital divides,” are experienced globally, weakening local capacity and exacerbating related issues such as youth emigration and essential service gaps (OECD, 2018; Spicer, 2021; Weeden & Kelly, 2020). ICT expansion and digital capacity building are even more challenging for mountainous rural communities. Isolated geographies and rugged landscapes drastically increase the costs of constructing and maintaining physical infrastructure, requiring place-based strategies to effectively integrate Smart strategies (Bürgin & Mayer, 2020; Columbia Basin Trust, 2022; Zavrtnik et al., 2018).

Canada’s legacy of staples economic development and market-led proliferation of critical infrastructure have limited and weakened the digital capacity of rural communities, limiting their ability to seize development opportunities (Hambly & Rajabiun, 2021; McNally et al., 2017; Weeden & Kelly, 2021). While the federal and provincial governments have made efforts to address these digital gaps, a comprehensive rural development strategy for the application of ICTs and place-based approaches does not exist (McNeely & Ashton, 2019; Pant & Hambly, 2017; Weeden & Kelly, 2021). Conversely, countries within the European Union (EU) and United Kingdom (UK) have attempted to shrink their digital divides and enhance rural development outcomes by enacting policies and initiatives based on the Smart Village approach (Beranič et al., 2019; Juan & McEldowney, 2021; Stojanova et al., 2021). Policies supporting the Smart Village approach focus on using place-based and participatory-based development strategies to address issues such as political engagement, economic competitiveness, and environmental sustainability (Juan & McEldowney, 2021; Stojanova et al., 2021; Zavrtnik et al., 2020). Current Smart Village approaches in the EU and UK show promise in delivering critical services and expanding development opportunities to strengthen rural resiliency (Juan & McEldowney, 2021; Visvizi & Lytras, 2018; Zavrtnik et al., 2018, 2020).

The Smart Village approach, however, is relatively new and its long-term effectiveness is unknown (Bürgin & Mayer, 2020; Visvizi & Lytras, 2018; Zavrtnik, 2018). Current Smart Village research, especially in mountainous areas, is nascent (Bürgin & Mayer, 2020; Stojanova et al., 2021). Understanding the impacts of Smart Village policies and initiatives requires a thorough investigation of both the content and practical implementation of initiatives on the lived experiences of rural actors. In contrast to Canada’s fragmented

approach, the EU and UK have adopted more cohesive strategies. In understanding the lessons from the EU and UK, there is an opportunity to reflect on how Canadian policy makers and rural-based actors could explore this approach and how it can be applied in a Canadian context.

This research examines the impact of the Smart Village policies and initiatives on rural development outcomes in mountainous rural communities and the concept's potential for mountainous Canadian rural spaces. Framed by discussions of Staples Theory, the Right to Rural, and Sustainable Mountain Development, this research examines how the Smart Village approach has impacted the perceptions and actions of local stakeholders who live or contribute to community development in mountainous regions. Through a series of key informant interviews, this research identifies five key impacts of the Smart Village approaches and discusses their applicability to rural mountainous spaces in Canada. These findings demonstrate that the Smart Village approach appears to be well-suited for mountainous rural communities in Canada, showing promise for policy to enhance the ability of rural people to utilize their natural assets to find innovative, place-based development solutions.

2.0 Literature Review

2.1 Building the Periphery: Canadian Rural Development and Approaches to Broadband Development

Rural communities throughout Canada have a long history of being in the periphery. During the 19th and early 20th centuries, rural communities in what is now Canada were strategically established far from metropolitan centers in the country's resource-rich hinterlands (Hayter & Barnes, 1990; Markey et al., 2008, 2019). Through the lens of Staples Theory, Canada's political and economic institutions have been molded by primary extraction industries, such as forestry and mining, to satisfy the high demand for resources in urban heartlands (Hayter & Barnes, 1990; Teitelbaum et al., 2019; Watkins et al., 2006). In the absence of local ownership and economic diversification, rural communities became reliant on staples production for subsistence (Hayter & Barnes, 1990; Markey et al., 2008, 2019; Teitelbaum et al., 2019). While some communities have lessened their reliance by developing secondary industries like tourism, many remain reliant on staple industries, fuelling economic instability and eroding rural lifestyles (Breen et al., 2019; Markey et al., 2008, 2015, 2019).

A rural community's physical geography greatly influences its economic and social structures, available resources, and investment opportunities (Hayter & Barnes, 1990; Markey et al., 2015). Access to technologies, particularly digital technologies, can enable rural communities to overcome geographical barriers to participate in the global economy and diversity economic development strategies beyond primary staples (Hayter & Barnes, 1990; Rajabiun, 2020; Weeden & Kelly, 2021; Wyckoff, 2016). A comprehensive policy strategy is crucial to facilitating this technological investment and subsequent rural development strategies (Markey et al., 2008; Weeden, 2020; Weeden & Kelly, 2021). However, Canadian public policy and financial investment to facilitate infrastructure development have failed to develop such a comprehensive policy (Markey et al., 2008, 2019, 2020; Teitelbaum et al., 2019).

Rural development and connectivity are joint responsibilities of the federal and provincial governments in Canada. Strategies emerging on these topics, which vary over time, are supported by rural and regional development actors (Blake, 2003; Breen et al., 2019; Markey et al., 2008, 2015; Minister of Rural Economic Development, 2019). For example, British Columbia's rural development policy

shifted from early twentieth-century free enterprise and foreign investment models toward post-World War II Keynesian modernization policies designed to address regional disparities through resource sector growth, reflecting urban center growth models. (Blake, 2003; Hayter & Barnes, 1990; Peet & Hartwick, 2009; Markey et al., 2008). The rapid globalization and an economic recession of the 1980s ushered in economic restructuring in resource sectors, slashing rural development initiatives (Markey et al., 2008, 2019; Ryser & Halseth, 2017). The responsibility for rural development was downgraded to local governments and newly built development agencies without adequate capacity or investment to do so (Breen et al., 2019; Markey et al., 2008, 2019; Ryser & Halseth, 2017). While rural investment increased after the 2008 financial crisis, development approaches remained the same, with local assets and capacity being the primary determinant in development success (Breen et al., 2019; Peet & Hartwick, 2009).

Rural communities across Canada have explored a wide variety of approaches to address rural development and connectivity. It is important to note that Indigenous communities throughout Canada have experienced parallel challenges in connectivity as rural communities. Federal and provincial policy approaches have largely not taken into consideration the dynamics and priorities of Indigenous communities (McMahon et al., 2011; O'Donnell & Beaton, 2018). Despite the lack of comprehensive policy approaches, Indigenous communities have led place-based and participatory approaches overcome connectivity challenges. Illustrative Indigenous-led initiatives include K-Net SMART in northern Ontario and Quebec (Fisher et al., 2006), Broadband Communications North in Manitoba (Ashton & Girard, 2013), Beaver River Broadband in Saskatchewan (Daigle, 2024), and Ktunaxa Community Learning Centres e-health services project in British Columbia (Jarvis-Selinger et al. 2012). Indigenous place-based development strategies are important and provide many lessons for rural settlements across the country.

In the post-Covid era, rural spaces have been marked by slower growth rates, limited access to essential services, and an exodus of young professionals, reducing the development capacity of rural communities (Davies, 2021; Hanlon & Skinner, 2022; Markey et al., 2020). This phenomenon poses a threat to the sustainability of rural communities across Canada. Globally, rural areas lag their urban counterparts in ICT infrastructure and digital capacity. These gaps are exacerbated in mountainous communities, where geographical realities make the installation of ICT infrastructure more challenging (Weeden & Kelly, 2021). Canadian federal and provincial policy approaches also expand digital divides, relying on large, privately held internet service providers (ISPs) for service installation and provision, making infrastructure decisions based on profitability over equity (McNally et al., 2017; Weeden & Kelly, 2021; Worden & Hambly, 2022). Rural Canada's continued low rates of ICT infrastructure access diminish digital literacy and skill rates in communities, contributing to rural decline (Li et al., 2019; Markey et al., 2008; Roberts et al., 2017). As these trends continue, alternative approaches need to be considered to guide policy makers at the senior levels of government, particularly when considering mountainous areas, to better access and utilize ICTs and other innovations to help further sustainable rural development.

2.2 Reclaiming the Periphery: The Right to the Rural and Implications for the 21st Century

Current Canadian digital and connectivity policies struggle to embrace split priorities in their overarching framework, attempting to meet both the needs of rural Canadians and appease its large ISPs (McNally et al., 2017; Weeden &

Kelly, 2021). In this uncertain policy environment, embracing rights-based approaches to rural development can change how these issues are addressed.

The *Right to the Rural*, based on the Henri Lefebvre's *Right to the City*, centers the uniqueness of rural life and its connection to the natural environment (Foster & Jarman, 2022; Harvey, 2008). Building on foundational human rights documents like the United Nations Declaration of Human Rights, this approach advocates the right of rural people to have access to the essential services that facilitate rural life and steer the development process through direct democratic methods (Foster & Jarman, 2022; Peet & Hartwick, 2009). As it relates to building rural digital capacity, the implementation of ICTs has a liberating potential to enhance the autonomy of rural regions by shrinking the distances between people and expanding opportunities for collaboration (McNally et al., 2017; Roberts et al., 2015; Weeden & Kelly, 2021). However, rural regions must be cautious of how they implement these technologies and with whom they partner with to do so (Weeden, 2021).

Place-based approaches, such as Smart Mountain Development (SMD), center the diverse geographic challenges experienced in rural areas and attempt to tailor solutions to development problems. Mountainous regions are characterized by infertile soil conditions and rugged terrain which make agricultural and extractive activities hard to sustain (Breen & Robinson, 2021; Bürgin & Mayer, 2020; Gløersen et al., 2016). While mountainous regions face similar challenges as most rural regions, they also offer a diverse range of development opportunities through their natural assets, biodiversity, and tourism opportunities (Gløersen et al., 2016). SMD recognizes these realities and provides a holistic approach to understand these social and economic complexities that dictate sustainable development outcomes (Price et al., 2004). Based on ecological, economic, and socio-cultural indicators, SMD provides a framework to help develop place-based strategies that can maximize the effectiveness of rural development policies, expand ICT access and capacity, and allow citizens in mountainous regions to better exercise their Right to the Rural.

However, these projects are the exception (Breen & Weeden, 2022). The incoherent and uncoordinated nature of Canada's rural development policy environment makes it difficult to create, replicate, and sustain these types of place-based projects in other rural settings. In supporting the Right to the Rural, how can policies be designed to further rural development through place-based and participatory digital development strategies? What approaches can be used to reinforce the Right to the Rural and SMD in a Canadian context?

2.3 Redefining the Periphery: The Smart Village Approach and Policy Implications

Recognizing the necessity to address rural decline, many countries have enacted new policies to meet their rural development objectives. The Smart Village approach is designed to implement place- and participatory-based strategies to support rural development. While no legal definition exists in EU policy, the European Commission created a working definition that guides the implementation of the Smart Village approach in rural development policy within the EU:

... communities in rural areas that use innovative solutions to improve their resilience, building on local strengths and opportunities. They rely on a participatory approach to develop and implement their strategy to

improve their economic, social and/or environmental conditions, in particular by mobilising solutions offered by digital technologies. (Juan & McEldowney, 2021, p. 3)

Rural development policies that support the Smart Village approach encourage regional collaboration and the use of holistic, citizen-designed strategies to synergize with ongoing projects and funding opportunities (Anastasiou et al., 2021; Bürgin & Mayer, 2020; Zavrtnik et al., 2018, 2020). The approach has been tested around the world, perpetuated in policies and programs meant to address a variety of different issues related to sustainable development, including climate adaptation, healthcare access, and economic growth (Bürgin & Mayer, 2020; Stojanova et al., 2021; Zavrtnik et al., 2018). Initiatives and supportive policies are regionally specific and vary based on the contextual realities within political jurisdictions.

In the EU, with 44.6% of its population residing in rural regions, communities exist in a wide range of topographies, socio-economic development levels and cultural traditions (Juan & McEldowney, 2021; Stojanova et al., 2021; Zavrtnik et al., 2018). Similar to Canada, rural communities in the EU experience trends of rural decline, including ageing and shrinking populations, reduced economic competitiveness, and over reliance on natural resource-based industries (Anastasiou et al., 2021; Filippini et al., 2020; Paniagua et al., 2020).

The Smart Village approach was introduced in 2017 through the EU Action Plan for Smart Villages. Building on the Cork 2.0 Declaration, the EU Action Plan for Smart Villages identifies existing policy areas and funding sources to promote projects and strategies implementing the Smart Village approach (European Commission, 2016; Juan & McEldowney, 2021; Zavrtnik et al., 2018, 2020). Regionally, funding mechanisms such as *Liaison Entre Actions de Développement de l'Économie Rurale* (LEADER) help distribute EU-level funding to sustainably supplement initiatives utilizing the Smart Village approach (European Network for Rural Development [ENRD], 2021).

Several Smart Village pilot projects have been established since its creation in 2017, such as Smart Village 27 and its precursor, Smart Village 21 (Smart Rural 2021a; 2021b; Zavrtnik et al., 2018). In mountainous countries, several Smart Village projects have been launched within the Interreg Alpine Space, including electric car sharing and the establishment of digital hubs (Stojanova et al., 2021; Interreg Alpine Space, 2021). Initial findings from these projects demonstrated improved rural development outcomes by strengthening partnerships with urban centers and providing improved essential services (Interreg Alpine Space, 2021). These projects benefited from coordinated approaches among the EU, each country's domestic Smart Village strategies, and other funding sources, leaning into the goals of the EU's Cohesion Policy (Stojanova et al., 2021; Interreg Alpine Space, 2021).

Shifting federal and provincial policy to incorporate rights-based approaches such as the Right to the Rural and SMD through the Smart Village approach, could prove helpful in supporting rural development. The EU and UK's adoption of the Smart Village approach shows early promise in delivering critical services and opportunities to strengthen rural resiliency (Anastasiou et al., 2021; Bürgin & Mayer, 2020; Zavrtnik, 2018, 2020). Further investigation is needed to understand the impacts of these policies and initiatives on how they directly impact the lived experiences and actions of rural actors in mountainous settings. Research in the field is relatively new, and questions remain about its long-term effectiveness, with Smart Village projects swaying heavily to particular issues,

such as youth migration and depopulation, while neglecting other areas, such as climate action, infrastructure, and social aspects of life (Stojanova et al., 2021; Visvizi & Lytras, 2018; Zavrtnik, 2018). The Smart Village approach is nascent, and information must still be collected from other jurisdictions outside the Alpine zone (Bürgin & Mayer, 2020; Stojanova et al., 2021; Visvizi & Lytras, 2018). In doing so, lessons that can be extracted from these experiences for Canadian policy makers and other rural development actors to explore if and how this approach can be applied in a Canadian context.

3.0 Methods

This study utilized a case study approach and semi-structured informant interviews to examine how Smart Village projects impact the lives and perceptions of those living in mountainous rural communities. Case studies allow for an in-depth and rigorous analysis of a single case, which can encompass many different forms and cover a wide range of topics (Bryman & Bell, 2019; Thomas, 2011). A case study allows the researcher to gain contextual understanding of the Smart Village approach's application in mountainous regions and how associated projects have been used to support rural development within these communities. Potential cases were identified from EU members and former members with active membership in Euromontana.¹ From this pool of potential cases, four key criteria were used to identify a comparative case to Canadian mountain regions: government structure; presence of mountainous regions using a Nomenclature of Territorial Units for Statistics (NUTs) Level 3 classification (European Union, 2018);² active Smart Village projects; and policy and community documents available in English. Using Thomas' (2011) approach to key or outlier case studies, Scotland was determined to be the most appropriate case study region.

Nearly half of Scotland is covered in mountainous terrain as classified by the NUTs 3 classification system, with most of the population residing in rural settlements in the Highland and Upland regions (European Union, 2023; Scottish Government, 2021). Due to their geographical distribution, the Scottish Highlands and Uplands are some of the only regions in the UK or the EU that are classified the same as mountainous rural areas in Canada (Féret et al., 2020). As well, Scotland is governed under the UK's Westminster Parliamentary system (Scottish Parliament, n.d.). While Canada operates under a federal system of governance, the UK uses a devolved parliamentary system, allowing formerly centralized powers to be governed by national parliaments in Scotland, Wales, and Northern Ireland (UK Parliament, 2023). The Scottish National Parliament's powers are similar to those of the Canadian provinces, including rural affairs (Scottish Government, 2023). As the northernmost country in the United Kingdom, Scotland was part of the EU during the creation and implementation of the Smart Village concept into European policy in 2016. In the aftermath of Brexit, Scotland maintains close connections with EU organizations and maintains membership in

¹ Euromontana is a conglomerate of regional development agencies, local authorities, and other bodies dedicated to the cooperative development of European mountainous regions (Euromontana, 2023). As a body not directly in the European Union, it maintains membership with member and non-member states. This provides a more holistic grasp of countries throughout the European continent that directly deal with mountain-based issues.

² Nomenclature of territorial units for statistics, or NUTs, is a classification system used by the European Union to collect extraterritorial statistical data from its member states. NUTs 3 is the most granular of the three grouping sizes, with 1,166 regions ranging from 150,000 to 800,000 people in population sizes (European Parliament, 2025). This categorization can also be used to identify predominately mountainous and rural regions within the EU and UK, making it an ideal unit of analysis for identifying an appropriate case study location (Féret et al., 2020).

the Smart Village Network (Smart Village Scotland, n.d.). The Scottish Government has several place-based rural development policies, including several projects using the Smart Village approach have been created across the country with varying degrees of success (Slee, 2018).

Scotland's combination of similar physical environments, government structure, and rural population base presents an optimal case to examine how Smart Village projects have been developed in mountainous communities outside the EUs funding and policy structures. In turn, this case study provides an opportunity to explore factors of success or failure involved in continuing the Smart Village approach as a tool for innovation in rural development practice and how it could apply in a Canadian context.

Semi-structured interviews were conducted with key stakeholders to gain insight on local experiences and perceptions of projects using the Smart Village approach, Scottish rural development policy, and rural development practice across the Highlands and Uplands. Interviewees included representatives of communities implementing the Smart Village approach and organizational representatives/professionals directly involved in rural development in Highland and Upland communities through regional intermediary or governmental organizations. A total of 15 semi-structured interviews were conducted in 2024. Due to a limited number of active Smart Village projects in the Highlands and Uplands of Scotland, representatives of Smart Village initiatives outside of the region and closer to Scotland's Central Belt were included to highlight the impact of geography on initiative success.³ Interviews were transcribed and coded in NVIVO. A thematic approach to coding was used to unveil the intertwining narratives to describe the behaviours, experiences, and viewpoints of those involved in the research process (Kiger & Varpio, 2020). Emerging themes were codified and organized into distinct categories to bring together a rich tapestry of Smart Village development in Scotland, as described in the following section.

4.0 Findings

The findings demonstrate the development of Smart Village approaches within Scotland and how they impact the actions and perceptions of those living in Highland and Upland rural communities. Participants' lived experiences reflect the diverse thoughts and capacities within and between rural spaces with the Highlands and Uplands. The findings exemplify the Smart Village approach's ability to address place-based issues, the complications implementing strategies in mainstream rural development practice, and broader issues of community development facing mountainous communities. Five key themes emerged from the content analysis of the semi-structured interviews.

4.1 *Benefits of Smart Village Approaches*

Use of the Smart Village approach in Scotland is relatively new, with several initiatives adopting it over the past decade (Slee, 2018). These projects have been led predominantly by third-sector actors, such as voluntary groups, social enterprises, and charities. As a participatory-based approach, each Smart Village project was created to address place-specific issues. In successful cases, these initiatives have helped foster greater citizen participation in local decision-making and the adoption of ICT-driven development tools. For example, one

³ The Central Belt refers to the stretch of the country between Glasgow and West Edinburgh (Murray, 2020). It is home to the country's two largest cities and divides the country's "Lowlands" in the south and "Highlands" to the North.

small town was able to partner with Smart Village Scotland, a non-profit dedicated to helping communities set up web-based community management tools, to deliver part of its community-led visioning report. As Participant 5 described the purpose impact of the plan:

The plan was about building that capacity within the community to drive projects forward, identifying what those projects were through consultation and building it from the ground up within the community, which was very important...Rather than the Big Wigs in the County Council or further up in the local government structure telling us that “this is the plan for your community,” it’s also telling them “this is our plan for our community, and these are things we think are important to us.”

The ongoing success of the plan was predicated on its active approach to community outreach and buy-in. A second project uses community owned environmental data tracking, such as greenhouse gas emissions and traffic monitoring systems, to help direct and implement community development projects. Participant 10 explained how this information has been applied towards community decision making regarding transportation:

All of the information that the Smart Village sensors and data systems produce are shared openly with [the community council and community trust]. Then, those groups will build them into the local place plan, using the information from the smart sensors and networks, to inform the kind of decision making we want to see taken by the government in conjunction with the community council going forward.

Through these activities, the community has been able to implement several initiatives, such as solar powered heating systems, and plans to implement other projects, including installing refrigerator door sensors for independent elderly residents to support community wellness checks. Moreover, by having these systems controlled by volunteer groups, it provides a counterbalance to bureaucratic structures and empowered residents and community groups to work collaboratively towards their goals. As explained by Participant 10:

For the very first time, the villagers are actually generating this information. It’s not generated by the government and then given to us, which creates a degree of uncertainty of the validity. Has the council given us everything? Is it honest? Is it being modified in any way? So, they are generating the data so they believe it. It is inarguable information.

Where both initiatives have achieved sustained success, they have empowered citizens to direct the community development process and implement innovative solutions that meet their collective needs. These successes show the varied application of Smart Village approaches, ranging from centralized community management tools to environmental sensing, spurring further projects within the community. These projects have helped centralize the role of the citizen in generating data to further community wellbeing and improve development outcomes, parallel to the approach advocated by Right to the Rural scholars.

4.2 Human Resources and Community Ownership

The success of initiatives using the Smart Village approach in Scotland has been predicated on the dedication of passionate, skilled volunteers and on sustained financial and technical support from local and regional development organizations. In both previous noted examples, the initiatives were spearheaded by digital champions, individuals or groups within communities who had worked in the EU or possessed knowledge of the Smart Village approach and wanted to implement similar strategies to address local development. Participant 12 noted the importance of having highly skilled volunteers:

Sustainable energy was something that was mentioned sometimes. But it was only when a person moved to the village with all of [their] expertise and understanding about smart air quality monitoring and traffic monitoring that we moved into that area more actively. I don't have the expertise or the interest in that. That is [their] role.

Across Scotland, local development initiatives are also aided by community and development trusts, established volunteer organizations created to manage and distribute funding to support community development projects. These groups are also used to help use community-owned assets to support Smart Village initiatives. Community and development trusts in the Highlands and Uplands require the work of several community-based volunteers. Several participants noted the departure of youth from rural communities, driven by limited economic and social opportunities. Thus, community and development trusts are typically coordinated by older volunteers. While some communities must grow and maintain diverse populations in terms of age, several participants noted concerns regarding this volunteer dependency for the sustainability of long-term projects and the limited capacity to take advantage of digital technologies. Participant 8 discussed this anxiety regarding the longevity of community-driven projects:

Sustainability, not only in terms of environmental sustainability, but sustainability of the community itself. Because a lot of the people who do a lot of volunteering in the village are older, they are very worried that once they retire a lot of their activities won't keep momentum.

Furthermore, Highland and Upland communities recognize the power of their natural assets as a strength. As mountains create physical boundaries for communities, the geography helps foster tightly knit communities with strong volunteer bases. Community and development trusts are also able to utilize community owned energy infrastructure, such as dams and windmills, and recreation and tourism assets to create a reliable income stream and attract skilled workers to build local capacity. Participant 15 explained:

Our geography is also, to put it in a positive spin, is one of our greatest assets in a way. It shapes it in a negative sense in that government driven development is not supporting as much as it could, but the community development, the development that communities do, really does take advantage, support, and aligns itself with its own geography. That's why you get, in a way, so much innovation because all of these communities

across Scotland, in the borders, across all the Uplands, up until Shetland, everywhere they are all really different and, although they're small, there are very skilled people there and very entrepreneurial people. You can see how each community is very different.

However, for communities that do not have access to these natural and human assets, implementing initiatives using the Smart Village approach can prove challenging.

4.3 Uneven Benefits

Interviewees also highlighted the challenges of pursuing participatory-led approaches to rural development and ICT expansion, particularly in mountainous regions. Initiatives using the Smart Village approach in Highland and Upland communities included in this study have struggled to sustain themselves, influenced by difficult geographies, limited capacity, and external shocks.

As the Highlands and Uplands are sparsely populated, regional development organizations operate within large administrative boundaries. However, as political boundaries tend to fall along mountain ranges, communities within the same administrative boundaries may rarely coordinate with each other. These geographical realities force regional intermediary organizations that provide developmental support to rural communities, such as the Scottish Rural Network, to work cross-jurisdictionally, making it challenging to operate within a complex, political environment to organize development works within. Participant 2 noted this complexity in development works:

I would say it's a complex landscape. You know, we are like a lot of mountain areas, and you can see this on the European continent as well, the boundaries meet in the middle of the mountains. Immediately you're working across several administrative units and that means that you have to be adept at knowing who the right people to go to in each organization... it's not going to one organization, it's going to five organizations.

Infrastructurally, rural communities across Scotland struggle to access adequate broadband and ICT infrastructure. Scottish government-led initiatives like Reaching 100% (R100) have helped 95% of the country achieve direct access to fibre broadband service (Audit Scotland, 2018; Digital Scotland, n.d.).⁴ However, several respondents identified drastically reduced access to adequate internet service in communities located further away from regional hubs. This lagging and uneven dispersion of quality broadband infrastructure negatively restricts the tools available to communities, the digital skills of their residents, and limits their development capacity.

Depending on a community's development capacity, some are more vulnerable to external shocks impacting the progress of their development initiatives. For example, the COVID-19 pandemic was disruptive to several ongoing Smart

⁴ R100 is a Scottish Government programme designed to spread broadband infrastructure across the county of Scotland through a combination of commercial investment and subsidies for last mile infrastructure. As of March 2025, it has connected 78,000 premises across Scotland, including 38 Scottish Islands (Scottish Government, 2025).

Village projects at the time of this study. Similar to Canadian rural communities, the COVID-19 pandemic accelerated the adoption of digital technology in daily life, with a rapid uptake of online social platforms. This altered how rural residents and organizations interacted with each other, with some respondents noting increased attendance rates for community meetings, more frequent interactions between development professionals, and collaborations between neighbouring communities previously not considered prior to the pandemic. However, other participants noted that limited ICT infrastructure and digital skill gaps restricted citizens' access to volunteer networks, hindering the progress of development works. Furthermore, without digital champions or external support to provide their knowledge and support, some projects became overwhelmed by maintaining them long term. Participant 8 noted:

I would like to state that my struggles with the website are not due to the Smart Village coordinators that helped us set it up. It's just because I don't think none of us expected the amount of work and upkeep.

The COVID-19 pandemic, coinciding with the cost-of-living crisis (Francis-Devine et al., 2023), also forced a realignment in government funding and development organization priorities. This stalled the progress of several Smart Village initiatives. As Participant 14 illustrated:

The capacity of people to deliver, and also to public bodies, councils for example or other bodies who are working, also after COVID and the cost-of-living crisis are still in that high workload arena where projects, potentially, are not at the forefront of what they are trying to achieve, unless it is an in-house project. So, there is a challenge in terms of capacity across the piece really.

In cases where communities are limited by available digital, human, and financial resources, external shocks, infrequent funding, or conflicting local priorities can drastically mitigate the success of initiatives using the Smart Village approach. While rural stakeholders still see potential in the Smart Village approach, its universal feasibility is doubtful without the proper technical, financial, and political support.

4.4 Policy Confusion

Another aspect impacting the adoption of the Smart Village approach in Scotland is the current policy environment. The UK's departure from the EU cut development organizations' access to sustained development funding through EU initiatives, such as the LEADER program. While Scotland maintains a close relationship to the EU, government bodies and development organizations were forced to shift development priorities, limiting the financial assets available for initiatives using the Smart Village approach. Compounded by the COVID-19 pandemic and the cost-of-living crisis, these policy shifts prevented many organizations and communities from maintaining ongoing initiatives using the Smart Village approach. Participant 9 illustrated how this has impacted the initial deployment of some Smart Village initiatives:

[W]e had some limited funding to develop, initially. In 2019 we were trying to pull funding together and then we ran into COVID and that kind of went on the backburner.

Brexit has also made it more difficult for Scottish development organizations to interact with EU based knowledge sharing networks. While UK-based organizations are not barred from interacting with their European colleagues, some maintain membership in knowledge sharing networks like the Smart Village Network (Smart Village Scotland, n.d.), the loss of those official partnerships and funding streams has reduced the types of collaborative projects that can be pursued. These two impacts are best explained by Participant 14:

I think that's an obvious impact in that we used to fund 2, 3, 4, 5-year projects ... Those shorter-term projects are now, and when you talk a year, you're not talking a delivery over a year, you're probably talking about a project going into delivery for 6-months, really in the middle of that year, to allow for the work up and the shutdown. That's a big impact in terms of actual capacity to deliver in the communities.

I would say that we did quite a lot of transnational work in terms of peer learning and learning journeys with the EU countries. We were working with some groups in Finland, some groups in the Republic of Ireland, Estonia, the Netherlands, and we had a really good European network that was built. We can still access those networks but it's not as easy anymore.

At a Scottish policy level, the definition of the Smart Village approach remains unclear for most rural stakeholders, with no consensus on how to define it among Scottish rural actors. To effectively translate the Smart Village approach into rural development policy and practice, it must be defined and communicated in a way that best meets the needs of rural communities. As Participant 4 noted, the Scottish government plans to create a specific Smart Village policy to apply the approach into their rural development framework to address several issues specific to rural Scotland. They provide a metaphor of adapting EU policy supports around the Smart Village approach to fit the Scottish context,

Basically, you've got this McDonald's meal, that's what Europe does. Here is the format that we've got to do there ... The Scottish government's position is to try to remain aligned with Europe where possible, but we are not bound by the rules. So, we have a great flexibility here to see works for Scotland and take the bits that we like ... So, I think we are probably in a better place policy wise to take the best of what is there but still remain broadly aligned with what they are doing. There is flexibility and we can make a different McDonald's meal if we want to.

While this shows initiative on the part of policy makers to embrace the Smart Village approach, community and organizational stakeholders all expressed concern over *how* rural development policy has been approached in recent years. Participants from intermediary organizations raised concerns over the lack of communication between government departments. Without effective interdepartmental communication, policies become siloed in specific ministries, leading to policy decisions that do not benefit rural communities across the country evenly. Participant 9 noted:

Structurally, there isn't enough collaboration within the government. There is a lot of collaboration out of government across communities but that is not replicated. So, policy tends to be developed in silos and not communicated across directorates. I think that's the cause of a lot of the problems.

Several respondents also mentioned concerns over the continued centralization of policy in the Central Belt of Scotland. Respondents particularly noted a desire to improve relationships between communities and policy makers by creating more policy roles in regions outside the Central Belt. Regional intermediary organizations play a crucial role consulting with communities and transmitting information but recognize any collaboration has to adapt to the current structure of rural development organizations within a country. As described by Participant 15, attempts to make a centralized system of development do not meet with the realities faced on the ground:

In Scotland, we don't actually have that kind of structure. We have a very complex but good landscape. I think a lot of people feel it's a bit too complex, the word cluttered is used. Too many organizations but, in fact, it is a complexity that has evolved from the community and works for [it].

4.5 Desire for Collaboration and Trust

While stakeholders voiced a desire for better relationships with policy makers, participants also want to have better collaboration between communities. Regionally, the mountainous landscape of the Highlands and Uplands complicates collaborative action between communities. Communities exist within a political paradox where policies and development actions must work on a multijurisdictional basis but also address the intensely localized issues faced by each community within its jurisdiction.

Regional intermediary organizations play a crucial role in this development landscape, sharing information on best practices with communities and building relationships among rural actors. These organizations typically have strong ties to the Scottish government, but as Participant 11 noted the number of rural-based professionals is limited:

... my degree is in sustainable rural development, which was done through the University of Highlands and Islands. There is a skills and experience deficit in community development in the Highlands and there were about 4 or 5 of us who did the degree from start to finish....

those who did the degree went on to use it, but there doesn't appear to be a pipeline of people being prepared to step up.

A lack of rural development professionals, matched with the geographical and political realities experienced in Highland and Upland communities restricts local and regional rural development capacity. However, participants from regional organizations and communities noted a desire among rural stakeholders to set up a centralized network for communities to share knowledge, resources, and projects. Developing these networks can be challenging. While communities often do not collaborate with each other unless there is a shared interest, Participant 13 noted how making these networks known and accessible to rural actors can provide benefits locally and nationally:

I think one thing that needs to be done is more of this done on scale and to look at the effects that would have on that particular area. That needs collaboration between other regions. Again, what's getting done in one area would have to be seen in neighbouring areas so there can be this share of data, resources, and technology so there is no type of barriers [...]; so there is a clear strategy of how that fits then. Also, what's getting done fits into the priorities seen both at a Scottish and UK government level.

However, the crucial element to the success of implementing policy and initiatives based on the Smart Village approach is building trust with rural actors. It is evident among interviewees that there is a desire to share best practices and resources among communities and organizations to enhance their individual and collective development capacity. Regardless of where one lives in the Highlands and Uplands, residents will pursue development opportunities that meet their local needs and are within their capacity to achieve. Thus, if stakeholders do not believe a proposed idea or initiative can meet those objectives, the project's momentum grinds to a halt. Several participants believe that the Smart Village approach, if implemented properly, can be used to achieve the development objectives of all relevant stakeholders. Participant 7 provided further context to the importance of personal connection in the context of development:

Collaborations, in my opinion, work best where there is a personal connection. When you then get on with that person, that's what then enables a collaboration to happen. There must be that connection and synergy that you feel for something to work properly. Otherwise, it's just a statement that you'll be willing to collaborate with.

As the findings relate to the research question, Scottish development initiatives following the Smart Village approach demonstrate the nuanced impact they have on the perceptions and actions of local actors. Where initiatives have achieved sustained success, they have empowered citizens through collaborative decision making and asset ownership, made communities more resilient to external shocks, and spurred other development projects. However, for communities in the Highlands and Uplands, the natural geography, limited digital and infrastructural capacity, and political complexity can limit the success of development projects. In the absence of supportive policies, sustained project funding, and technical support, communities can become overwhelmed and

limited in their development opportunities. However, as several participants believe, the Smart Village approach, if implemented properly, can be used to achieve the development objectives of all relevant stakeholders. Participants 9 noted:

You could argue that having a strong Smart Village for either a geographical community or a community of interest is all part of creating wellbeing because it is the means connecting, communicating, and collaborating that are really important.

5.0 Implications and Conclusions

The Smart Village approach is one piece of a diverse network of Smart concepts that impact rural development. The case study findings reflect many of the realities experienced by mountainous rural areas in Canada and the EU, with communities in the Scottish Highlands and Uplands experiencing similar symptoms of rural decline, including youth emigration, lagging ICT infrastructure, and limited access to essential services (OECD, 2018; Spicer, 2021; Weeden & Kelly, 2020). Moreover, in the absence of the EU's policy framework and funding mechanisms, many communities lack the support to maintain development projects, with existing capacity and assets being the key determinant of success (Breen et al., 2019; Peet & Hartwick, 2009).

However, the case study findings extend and refine current Smart Village literature by highlighting the importance of intragovernmental synergy and decentralization in creating effective rural development policy. While intermediary organizations, like community trusts, can adapt to the needs of their communities, national-level policies can become too generalized, generating suboptimal results when rurality is isolated from other topics of public policy. The success of Smart Village initiatives in Scotland has largely been dependent on collaboration. By locating policy makers in the communities they serve, utilizing organizational networks to sustainably support projects collaboratively with community members, can build the trust needed for citizens to buy into policy ideas and incorporate geographical considerations into policy decisions.

In answering the research question, how the Smart Village approach impacted the perceptions and actions of local stakeholders who live or contribute to community development in mountainous regions, the findings demonstrate that successful implementation of the approach can be enhanced on a select minimum institutional and governance conditions. Institutionally, the transition from short-term grants to sustained, multi-year funding frameworks, akin to the EU's LEADER program, can help communities maintain long-term project momentum and weather external shocks. Moreover, governance models that prioritize community-led visioning and the local ownership of data and infrastructure, as detailed in Section 4.2, significantly improve the likelihood of success by redefining development experts as facilitators of community-led action. Together with dedicated and technically skilled volunteers enhancing local capacity, communities can better leverage the Smart Village approach in transformative ways, building rural resilience regardless of geography.

However, in the absence of these conditions, the sustainability of these projects, particularly given to volunteer fatigue, infrequent funding, and a lack of reliable regional professional support, attempts at using the Smart Village approach can yield suboptimal results. Communities will pursue any development project within their capacity. However, aligning with existing Smart Village literature

on successful cases, the Smart Village approach helps to empower rural people in the decision-making process and spur collaboration to effectively implement innovative solutions. Where some communities may lack the expertise or the assets to continue some projects, rural development professionals and knowledge networks can help fill those gaps, spurring more projects driven by community members.

As it relates to Canadian mountainous rural development, the diversity of natural assets and local capacity presents unique opportunities that demand a new place-based policy regime that supports development approaches that protect rural citizens' Right to the Rural, addresses rural/urban digital divides, and preserves long-term sustainability of rural lifestyles. Three main lessons emerge from this research to improve rural development policy to facilitate better community development outcomes in mountainous regions in Canada.

5.1 Balancing Volunteerism and Professionalism in Local Capacity Building

Initiatives following the Smart Village approach found success when prioritizing the participation of community groups in the visioning of their community development plans. As found in the case study, successful projects typically involved technically skilled and dedicated bases of volunteers. However, to balance the fluctuating availability of volunteers, the inclusion of regional development organizations can help provide the necessary technical expertise and funding support to make initiatives more sustainable, as noted by some interviewees. In a Canadian mountainous context, community development objectives are typically expressed through official community plans (Government of British Columbia, n.d.).⁵ These documents are primarily developed by planning staff and with stipulations for community consultation. The Smart Village approach presents a different approach to how official plans are traditionally crafted in the British Columbia and Canadian contexts and can serve as an alternative method for constructing these documents to emphasize community ownership and civic participation in the development and maintenance of official plans (Foster & Jarman, 2022). For example, research findings show that community visioning plans that are directed by volunteer bodies, involving all community groups, with the assistance of an external facilitator had greater success implementing Smart Village initiatives. This type of planning resembles the tenets of communicative planning, shifting the role of the planner from being an expert to being a facilitator of community action (Calderon & Westin, 2019).

Based on the findings, it is recommended that mountainous rural regions and all levels of government work to develop processes that centralize citizens and community groups in guiding the development of core planning documents or development projects. The findings from the case study also demonstrate the need for federal or provincial policies to facilitate the development of volunteer-led bodies to support directives using the Smart Village approach. Furthermore, decentralizing the location of experienced development or planning professionals so they are located within the communities they serve can help reduce capacity gaps and develop better place-based solutions.

⁵ Depending on the provincial jurisdiction, different terminology is used to describe community plans. For example, the Province of Alberta uses the term Municipal Development Plans (Government of Alberta, 2025)

5.2 Creating Diverse and Stable Funding Sources

Exemplified in the aftermath of Brexit, the success of the Smart Village approach in rural development practice was supported by sustained funding efforts created through EU policies and dispersed through regional delivery mechanisms. As demonstrated by some communities within the case study, access to diverse natural, technical, and community-owned financial assets, like energy infrastructure or tourism amenities, helped to enhance local development capacity, sustain projects, and provide protection from external shocks. While multi-sector collaboration with public and private sector actors is important, creating diversified funding streams, managed by voluntary groups, can help empower communities to pursue their own visions for development.

Canadian rural development has historically been led by Staples resource companies that invested little into building research and innovation capacity in rural spaces (Hayter & Barnes, 1990). Today, federal and provincial funding streams meant to address technological and development gaps are short-lived and have limited capacity. Existing regional organizations, both government- and community-based, should be leveraged as a mechanism to deliver better funding opportunities (Community Futures, n.d.; Government of Canada, 2023). It is recommended that the federal and provincial governments develop a sustained rural development fund that can be delivered on a regional basis to support connectivity and rural development. Additionally, policy experts should collaborate with rural development practitioners to determine ways to utilize existing funding mechanisms (e.g., Community Futures and Pacific Economic Development Canada) to develop avenues for communities to create locally owned assets that can help improve the success of place-based and participatory-based development schemes by providing sustained funding for development objectives.

5.3 Building Trust, Communication, and Networks

Effective community consultation and interdepartmental communication are crucial to the successful implementation of rural development and ICT policy. As noted in the findings, even when good consultation is conducted, solutions can be contained to a single ministry, leading to inappropriate policy responses in other sectors. If rural development and connectivity policies are siloed to a single ministry, or applied without considering the diversity of rural environments, they are more likely to produce negative development outcomes for rural communities. Federal and provincial governments should create comprehensive rural development strategies that address the regional contexts of geographically challenging regions, such as mountainous areas, that can help with the successful implementation of community-led or regionally specific strategies across Canada.⁶ Creating these strategies should be a collaborative process between governments and community stakeholders, establishing trust and building synergies between community works and federal and provincial policy.

Additionally, respondents noted a strong desire to create or join existing knowledge-sharing networks to develop proven solutions to fit their place-specific contexts. Implementing knowledge-sharing networks to disseminate

⁶ Some Canadian provinces have already developed regionally specific policies to help mountainous communities leverage their geographical strengths. For example, British Columbia has special permissions for designated resort municipalities, which receive funding to conduct projects that support tourism industries (Ministry of Jobs, Economic Recovery and Innovation, n.d.).

learning and resources between communities can help facilitate rural innovation and collaboration between mountainous communities. While macro-level data can spot trends of rural decline and instability, sharing success stories can shift rural decline narratives to demonstrate how rural communities are actively protecting their Right to the Rural. Rural development practitioners should focus on building and expanding current networks, such as local government associations or regional networks of economic development actors, to be transformational in rural development in enhancing collaboration and knowledge sharing. Furthermore, community development organizations thrive when they have full access to international knowledge-sharing networks. As the Smart Village approach expands globally, Canadian governments need to look both inward *and* outward to create better rural development practices and policies. Rural development actors should look to join or collaborate with existing networks, like those found in Europe, in an effort to share their knowledge and build structural support to allow rural communities to flourish.

5.4 Summary

The experience of Smart Village initiatives in Scotland demonstrates an innovative approach to support rural development in mountainous regions. The approach focuses on empowering citizen participation, recognizing the potential of natural assets, and the engagement of multi-stakeholder collaboration to achieve innovative place-based solutions. The Scottish Smart Village is not without challenges, particularly related to a reliance on volunteers, limited financial resources, overcoming difficult physical geographies, and a confusing policy ecosystem. Research on the long- and medium-term impact of Smart Village strategies is nascent. Future research needs to continue to monitor the impacts of the Smart Village approach throughout the EU and the UK to analyze longitudinal changes in rural prosperity through its application. Moreover, due to the geographic, social, and political diversity that mountainous rural communities inhabit worldwide, more case studies must be conducted to examine the application of the Smart Village approach and how it performs under varying political, social, and economic circumstances. The Smart Village approach from Scotland offers lessons for Canadian mountainous rural places; however, it is important to recognize these lessons are place-based and may not be equally applicable to all mountainous rural places in Canada.

Community partnership is central to the Smart Village approach, and the dynamics between different social groups vary based on age, gender, and economic class. Future studies would benefit from applying an intersectional lens to examine how these factors impact local decision making and the outcomes of Smart Village. Rural innovations like the Smart Village approach are not limited to the EU and UK alone. Canada has several projects that align with similar values to the Smart Village approach. Studies into the success and challenges of establishing some of these projects in the Canadian context, particularly Indigenous-led projects, and community-owned initiatives throughout Canada, will be valuable to understanding the policy needs of rural Canadians and how they can inform projects across the world. The future of rural is global; building networks will establish rural resilience not as a series of individual endeavours but as a movement to secure a sustainable rural future.

References

- Adamowicz, M. (2021). The potential for innovative and Smart Rural Development in the peripheral regions of Eastern Poland. *Agriculture*, 11(3), 188. <https://doi.org/10.3390/agriculture11030188>
- Anastasiou, E., Manika, S., Ragazou, K., & Katsios, I. (2021). Territorial and human geography challenges: How can smart villages support rural development and population inclusion? *Social Sciences*, 10(6), 193. <https://doi.org/10.3390/socsci10060193>
- Ashton, B., & Girard, R. (2013). Reducing the digital divide in Manitoba: A proposed framework. *Journal of Rural and Community Development*, 8(2), 62–78. <https://journals.brandonu.ca/jrcd/article/view/1000/227>
- Audit Scotland. (2022, March 15). *Update on the Scottish Government's R100 programme*. <https://audit.scot/publications/update-on-the-scottish-governments-r100-programme>
- Beranič, T., Zamuda, A., Brezočnik, L., Turkanovič, M., Lentini, G., Poletini, F., Lué, A., Vitale, A. C., Martinez-Gil, J., & Pichler, M. (2019, October). *Facilitating the digital transformation of villages*. In *Proceedings of the 30th Central European Conference on Information and Intelligent Systems (CECIIS)* (Varaždin, Croatia). https://www.researchgate.net/publication/336613410_Facilitating_the_digital_transformation_of_villages
- Blake, R. B. (2003, March). Regional and rural development strategies in Canada: The search for solutions. In E. M. Davis, V. L. Young, & J. Igloliorte (Eds.), *Collected research papers of the Royal Commission on renewing and strengthening our place in Canada*. <https://www.gov.nl.ca/publicat/royalcomm/research/blake.pdf>
- Breen, S.-P., Markey, S., & Reimer, B. (2019). Regional development in Canada: Eras and evolution. In K. Vodden, D. Douglas, S. Markey, S. Minnes, & B. Reimer (Eds.), *The theory, practice and potential of regional development* (pp. 12–30). Routledge.
- Breen, S.-P., & Robinson, D. (2021). *State of rural Canada 2021: Opportunities, recovery, & resiliency in changing times – British Columbia*. Canadian Rural Revitalization Foundation. <https://sorc.crrf.ca/bc2021/>
- Breen, S.-P., & Weeden, S. A. (2022, May 27). *Rural connectivity models: Digital readiness: An evaluation of rural broadband models in British Columbia - 2021 Applied Research Project*. Technical report. Selkirk Innovates. Castlegar, British Columbia: Selkirk College. <https://sc.arcabc.ca/islandora/object/sc:5871>
- Bryman, A., & Bell, E. (2019). *Social research methods* (5th Canadian ed.). Oxford University Press.
- Bürgin, R., & Mayer, H. (2020). Digital periphery? A community case study of digitalization efforts in Swiss mountain regions. In S. Patnaik, S. Sen, & M. S. Mahmoud (Eds.), *Smart Village Technology. Concepts and developments* (pp. 67–98). Springer International Publishing. https://doi.org/10.1007/978-3-030-37794-6_4

- Calderon, C., & Westin, M. (2021). Understanding context and its influence on collaborative planning processes: A contribution to communicative planning theory. *International Planning Studies*, 26(1), 14–27. <https://doi.org/10.1080/13563475.2019.1674639>
- Columbia Basin Trust Region. (n.d.). Columbia Basin Trust. Retrieved January 19, 2022, from <https://ourtrust.org/about/basin-map/>
- Community Futures Network of Canada. (n.d.). *Community Futures Network of Canada*. <https://communityfuturescanada.ca/>
- Cvar, N., Trilar, J., Kos, A., Volk, M., & Stojmenova Duh, E. (2020). The use of IoT technology in smart cities and smart villages: Similarities, differences, and future prospects. *Sensors*, 20(14), 3897. <https://doi.org/10.3390/s20143897>
- Davies, A. (2021). COVID-19 and ICT-Supported remote working: Opportunities for rural economies. *World*, 2(1), 139–152. <https://doi.org/10.3390/world2010010>
- Daigle, P. (2024). Addressing indigenous needs and fostering inclusion using the medicine wheel. An indigenous library perspective. In F. Michelot, S. Collin, & D. Peraya (Eds.), *La compétence numérique en contexte éducatif: Regards croisés et perspectives internationales* [Digital competence in an educational context: Cross-disciplinary perspectives and international outlook] (pp. 307–323). Presses de l'Université du Québec.
- Díaz-Roldán, C., & Ramos-Herrera, M. d. C. (2021). Innovations and ICT: Do they favour economic growth and environmental quality? *Energies*, 14(5), 1431. <https://doi.org/10.3390/en14051431>
- Euromontana. (2023). About us. <https://www.euromontana.org/en/about-us/>
- European Commission. (2016). *Cork 2.0 Declaration 2026 – A better life in rural areas*. https://territorialagenda.eu/wp-content/uploads/cork-declaration-2-0_en.pdf
- European Commission. (2017). *EU action for smart villages*. https://agriculture.ec.europa.eu/document/download/197ce76e-050b-45b4-986c-c57a7905edb2_en?filename=rur-dev-small-villages_en.pdf
- European Union. (2018). *Methodological manual on territorial typologies: 2018 edition*. Publications Office of the European Union. <https://data.europa.eu/doi/10.2785/930137>
- European Union. (2021). *LEADER/CLLD*. European Network for Rural Development (ENRD). https://eu-cap-network.ec.europa.eu/networking/leader_en
- European Union. (2023). *Glossary: Mountain Region*. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Mountain_region
- European Union. (2025). *Common classification of territorial units for statistics (NUTS)*. European Parliament. <https://www.europarl.europa.eu/factsheets/en/sheet/99/common-classification-of-territorial-units-for-statistics-nuts->
- Filippini, R., Marescotti, M. E., Demartini, E., & Gaviglio, A. (2020). Social networks as drivers for technology adoption: A study from a rural mountain area in Italy. *Sustainability*, 12(22), 9392. <https://doi.org/10.3390/su12229392>

- Fisher, A., Clement, A., & Walmark, B. (2006, February). The K-Net Development Process - A model for First Nations broadband community networks (Working Paper No. 2006-12). Canadian Research Alliance for Community Innovation and Networking. <https://utoronto.scholaris.ca/server/api/core/bitstreams/bbaa32d5-78b4-454d-ba2c-b5797be6664a/content>
- Foster, K. R., & Jarman, J. (Eds.). (2022). *The right to be rural*. University of Alberta Press. <https://ualbertapress.ca/9781772125832/the-right-to-be-rural/>
- Francis-Devine, B., Barton, C., Harari, D., Keep, M., Bolton, P., & Wilson, W. (2023, July 11). Rising cost of living in the UK. *UK Parliament*. <https://commonslibrary.parliament.uk/research-briefings/cbp-9428/>
- Gløersen, E., Price, M. F., Borec, A., Dax, T., & Giordano, B. (2016). *Research for REGI committee: Cohesion in mountainous regions of the EU*. European Union. <https://doi.org/10.2861/868467>
- Government of Alberta. (2025). *Municipal planning and development documents*. <https://www.alberta.ca/municipal-planning-development-documents>
- Government of British Columbia. (n.d.). *Official community plans for local governments*. <https://www2.gov.bc.ca/gov/content/governments/local-governments/planning-land-use/local-government-planning/official-community-plans>
- Government of Canada. (2023). *Pacific Economic Development Canada*. <https://www.canada.ca/en/pacific-economic-development.html>
- Hambly, H., & Rajabiun, R. (2021). Rural broadband: Gaps, maps and challenges. *Telematics and Informatics*, 60, 101565. <https://doi.org/10.1016/j.tele.2021.101565>
- Hanlon, N., & Skinner, M. W. (2022). On older person/place transformations: Towards a more-than-representational geography of aging in rural Canada. *The Canadian Geographer / Le Géographe Canadien*, 66(1), 145–155. <https://doi.org/10.1111/cag.12737>
- Harvey, D. (2008). The right to the city. *The City Reader*, 6(1), 23–40. <https://doi.org/10.64590/fmh>
- Hayter, R., & Barnes, T. (1990). Innis' Staple Theory, exports, and recession: British Columbia, 1981-86. *Economic Geography*, 66(2), 156–173. <https://doi.org/10.2307/143744>
- Interreg Alpine Space. (2021). *Synthesis report of the SMART Villages Project*. <https://www.alpine-space.eu/wp-content/uploads/2022/10/SmartVillages-synthesis-report.pdf>
- Jarvis-Selinger, S., Stacy, E., Wisener, K., Liman, Y., Lauscher, H. N., Ho, K., & Maki, D. (2012). Ktunaxa Community Learning Centres (KCLC): A model of community engagement in health, education, and training. In K. Ho, S. Jarvis-Selinger, H. Novak Lauscher, J. Cordeiro, & R. Scott (Eds.), *Technology enabled knowledge translation for eHealth: Principles and practice* (pp. 207–224). Springer. https://doi.org/10.1007/978-1-4614-3495-5_13

- Juan, A.M., & McEldowney, J. (2021) *Smart Villages concept, issues and prospects for EU rural areas*. European Parliament Research Service. [https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/689349/EPRS_BRI\(2021\)689349_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/689349/EPRS_BRI(2021)689349_EN.pdf)
- Kiger, M. E., & Varpio, L. (2020). Thematic analysis of qualitative data: AMEE Guide No. 131. *Medical Teacher*, 42(8), 846–854. <https://doi.org/10.1080/0142159X.2020.1755030>
- Li, R., Chen, K., & Wu, D. (2020). Challenges and opportunities for coping with the Smart Divide in Rural America. *Annals of the American Association of Geographers*, 110(2), 559–570. <https://doi.org/10.1080/24694452.2019.1694402>
- McMahon, R., O'Donnell, S., Smith, R., Walmark, B., Beaton, B., & Simmons, J. (2011). Digital divides and the 'First Mile': Framing First Nations broadband development in Canada. *International Indigenous Policy Journal*, 2(2). <https://doi.org/10.18584/iipj.2011.2.2.2>
- Markey, S., Breen, S.-P., Vodden, K., & Daniels, J. (2015). Evidence of place: Becoming a region in rural Canada. *International Journal of Urban and Regional Research*, 39(5), 874–891. <https://doi.org/10.1111/1468-2427.12298>
- Markey, S., Halseth, G., & Manson, D. (2008). Challenging the inevitability of rural decline: Advancing the policy of place in northern British Columbia. *Journal of Rural Studies*, 24(4), 409–421. <https://doi.org/10.1016/j.jrurstud.2008.03.012>
- Markey, S., Halseth, G., Ryser, L., Argent, N., & Boron, J. (2019). Bending the arc of the staples trap: Negotiating rural resource revenues in an age of policy incoherence. *Journal of Rural Studies*, 67, 25–36. <https://doi.org/10.1016/j.jrurstud.2019.02.002>
- Markey, S., Pierce, J. T., & Vodden, K. (2004). *Second growth: Community economic development in rural British Columbia* (pp. xviii–xviii). UBC Press.
- Markey, S., Ryser, L., & Halseth, G. (2015). “We’re in this all together”: Community impacts of long-distance labour commuting. *Rural Society*, 24(2), 131–153. <https://doi.org/10.1080/10371656.2015.1060717>
- Markey, S., Ryser, L., & Halseth, G. (2020). Local content and mobile labour: The role of senior governments in capturing benefits for local communities. *Journal of Rural and Community Development*, 15(4), 1–23. <https://journals.brandonu.ca/jrcd/article/view/1843/433>
- McNally, M. B., Rathi, D., Evaniew, J., & Wu, Y. (2017). Thematic analysis of eight Canadian federal broadband programs from 1994 to 2016. *Journal of Information Policy*, 7, 38–85. <https://doi.org/10.5325/jinfopoli.7.2017.0038>
- McNeely, G., & Ashton, W. (2019). Critical gaps in public policy programs in Canada: Identifying subject areas for graduate training in rural policy. *Journal of Public Affairs Education*, 25(3), 364–386. <https://doi.org/10.1080/15236803.2018.1473024>
- Minister of Rural Economic Development. (2019). Rural opportunity, national prosperity: An economic development strategy for rural Canada. <https://ised-isde.canada.ca/site/rural/sites/default/files/documents/2022-03/rural-strat-eng.pdf>

- Ministry of Jobs, Economic Recovery and Innovation. (n.d.). *Resort municipality funding—Province of British Columbia*. Province of British Columbia. Retrieved May 1, 2023, from <https://www2.gov.bc.ca/gov/content/tourism-immigration/tourism-resources/tourism-funding-programs/resort-municipality-funding-rmi>
- Murray, B. (2020, Oct 7). Central Belt: Where is it, how did it get its name and everything else you need to know about Scotland’s coronavirus hotspot. *The Scotsman*. <https://www.scotsman.com/lifestyle/travel/central-belt-where-is-it-how-did-it-get-its-name-and-everything-else-you-need-to-know-about-scotlands-coronavirus-hotspot-2996457>
- O'Donnell, S., & Beaton, B. (2018). A “whole-community” approach for sustainable digital infrastructure in remote and Northern First Nations. *Northern Public Affairs*, October, 34–37.
- OECD. (2018, February 23). Bridging the rural digital divide. *OECD Digital Economy Papers*, No. 265. Paris: OECD Publishing. <https://doi.org/10.1787/852bd3b9-en>
- Paniagua, A. (2020). Smart Villages in depopulated areas. In S. Patnaik, S. Sen, & M. S. Mahmoud (Eds.), *Smart Village technology: Concepts and developments* (pp. 399–409). Springer International Publishing. https://doi.org/10.1007/978-3-030-37794-6_20
- Pant, L. P., & Hambly Odame, H. (2017). Broadband for a sustainable digital future of rural communities: A reflexive interactive assessment. *Journal of Rural Studies*, 54, 435–450. <https://doi.org/10.1016/j.jrurstud.2016.09.003>
- Peet, R., & Hartwick, E. (2009). *Theories of development: Contentions, arguments, alternatives* (2nd ed.). The Guilford Press.
- Price, M. F., Jansky, L., & Iastenia, A. A. (2004). *Key issues for mountain areas*. United Nations University Press. <http://search.ebscohost.com/login.aspx?direct=true&AuthType=ip&db=e000xna&AN=118911&site=ehost-live&scope=site>
- Rajabiun, R. (2020). Technological change, civic engagement and policy legitimization: Perspectives from the rise of broadband Internet as an essential utility in Canada. *Government Information Quarterly*, 37(1), 101403. <https://doi.org/10.1016/j.giq.2019.101403>
- Roberts, E., Anderson, B. A., Skerratt, S., & Farrington, J. (2017). A review of the rural-digital policy agenda from a community resilience perspective. *Journal of Rural Studies*, 54, 372–385. <https://doi.org/10.1016/j.jrurstud.2016.03.001>
- Roberts, E., Farrington, J., & Skerratt, S. (2015). Evaluating new digital technologies through a framework of resilience. *Scottish Geographical Journal*, 131(3–4), 253–264. <https://doi.org/10.1080/14702541.2015.1068947>
- Ryser, L., & Halseth, G. (2017). Opportunities and challenges to address poverty in rural regions: A case study from Northern BC. *Journal of Poverty*, 21(2), 120–141. <https://doi.org/10.1080/10875549.2016.1141386>
- Scottish Government. (n.d.). Digital connectivity. <https://www.scotlandsuperfast.com/>
- Scottish Government. (2021). Rural Scotland key facts 2021. <http://www.gov.scot/publications/rural-scotland-key-facts-2021/pages/5/>

- Scottish Government. (2023). What the Scottish Government does. <https://www.gov.scot/about/what-the-government-does/>
- Scottish Government. (2025). About reaching 100%. <https://digitalconnectivity.campaign.gov.scot/about-r100>
- Scottish Parliament. (n.d.). What are the powers of the Scottish Parliament? <https://www.parliament.scot/about/how-parliament-works/what-are-the-powers-of-the-scottish-parliament>
- Féret, S., Berchoux, T., Requier, M., & Abdelhakim, T. (2020, March 31). *Framework providing definitions, operational typology and review of EU strategies for rural areas*. SHERPA. https://rural-interfaces.eu/wp-content/uploads/2020/04/SHERPA_D3-2_Framework-rural-definition.pdf
- Slee, B. (2018). Smart villages in Scotland. The European Network for Rural Development (ENRD) - European Commission. https://eu-cap-network.ec.europa.eu/publications/smart-villages-scotland_en
- Smart Rural 21 project. (2021a). Smart rural areas in the 21st century. <https://www.smartrural21.eu/>
- Smart Rural 27 project. (2021b). Smart rural areas in the 21st century. <https://www.smartrural27.eu/>
- Smart Village Scotland. (n.d.). SVS community. <https://www.smartvillage.scot/community>
- Spicer, Z., Goodman, N., & Olmstead, N. (2021). The frontier of digital opportunity: Smart city implementation in small, rural and remote communities in Canada. *Urban Studies*, 58(3), 535–558. <https://doi.org/10.1177/0042098019863666>
- Stojanova, S., Lentini, G., Niederer, P., Egger, T., Cvar, N., Kos, A., & Stojmenova Duh, E. (2021). Smart Villages policies: Past, present and future. *Sustainability*, 13(4), 1663. <https://doi.org/10.3390/su13041663>
- Suartika, G. A. M., & Cuthbert, A. (2020). The sustainable imperative—smart cities, technology and development. *Sustainability*, 12(21), 8892. <https://doi.org/10.3390/su12218892>
- Teitelbaum, S., Montpetit, A., Bissonnette, J.-F., Chion, C., Chiasson, G., Doyon, F., Dupras, J., Fortin, M.-J., Leclerc, É., St-Amour, C., & Tardif, J. (2019). Studying resource-dependent communities through a social-ecological lens? Examining complementarity with existing research traditions in Canada. *Society & Natural Resources*, 32(1), 93–112. <https://doi.org/10.1080/08941920.2018.1517913>
- Thomas, G. (2011). A typology for the case study in social science following a review of definition, discourse, and structure. *Qualitative Inquiry*, 17(6), 511–521. <https://doi.org/10.1177/1077800411409884>
- UK Parliament. (2023). Devolved parliaments and assemblies. Retrieved March 17, 2023, from <https://www.parliament.uk/about/how/role/relations-with-other-institutions/devolved/>
- Visvizi, A., & Lytras, M. D. (2018). It's not a fad: Smart cities and smart villages research in European and global contexts. *Sustainability*, 10(8), 2727. <https://doi.org/10.3390/su10082727>
- Watkins, M. (2006). *Staples and beyond selected writings of Mel Watkins*. McGill-Queen's University Press.

- Weeden, S. A. (2020, July 8). *Will post-COVID policies realize the full potential of rural Canada?* Policy Options. Retrieved November 13, 2020, from <https://policyoptions.irpp.org/magazines/july-2020/will-post-covid-policies-realize-the-full-potential-of-rural-canada/>
- Weeden, S. A. (2021). The right to multiple futures in the shadow of Canada's smart city movement. In K. R. Foster, & J. Jarman (Eds.), *The right to be rural* (pp. 253–270). University of Alberta Press.
- Weeden, S. A., Hardy, J., & Foster, K. (2022). Urban flight and rural rights in a pandemic: Exploring narratives of place, displacement, and “the right to be rural” in the context of COVID-19. *Annals of the American Association of Geographers*, 112(3), 732–741. <https://doi.org/10.1080/24694452.2021.2003179>
- Weeden, S. A., & Kelly, W. (2020, June 18). Addressing the digital divide: COVID-19 and the importance of connecting rural Canada. <http://crrf.ca/ri-digital-divide/>
- Weeden, A., & Kelly, W. (2021). Canada's (dis)connected rural broadband policies: Dealing with the digital divide and building “digital capitals” to address the impacts of COVID-19 in rural Canada. *Journal of Rural and Community Development*, 16(4), 208–224. <https://journals.brandonu.ca/jrcd/article/view/2057/543>
- Worden, D., & Hambly, H. (2022). Willingness to pay and pricing for broadband across the rural/urban divide in Canada. *Telecommunications Policy*, 46(2), 102247. <https://doi.org/10.1016/j.telpol.2021.102247>
- Wyckoff, A. (2016, July 23). Digital economy: Securing the future. *OECD*. <https://doi.org/10.1787/25be10c3-en>
- Zavratnik, V., Kos, A., & Stojmenova Duh, E. (2018). Smart villages: Comprehensive review of initiatives and practices. *Sustainability*, 10(7), 2559. <https://doi.org/10.3390/su10072559>
- Zavratnik, V., Podjed, D., Trilar, J., Hlebec, N., Kos, A., & Stojmenova Duh, E. (2020). Sustainable and Community-Centred Development of Smart Cities and Villages. *Sustainability*, 12(10), 3961. <https://doi.org/10.3390/su12103961>