San Andres, Emmanuel A.; Singh, Satvinderjit Kaur; Kai, Jenny Ayumi

Book

Development and integration of remote areas in the APEC region

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Development and Integration of Remote Areas in the APEC Region

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Prepared by:
Emmanuel A. San Andres, Satvinderjit Kaur Singh, and Jenny Ayumi Kai*
Asia-Pacific Economic Cooperation Policy Support Unit
Asia-Pacific Economic Cooperation Secretariat
35 Heng Mui Keng Terrace
Singapore 119616
Tel: (65) 6891-9600 │ Fax: (65) 6891-9690
Email: psugroup@apec.org Website: www.apec.org

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* Analyst, Researcher, and Intern, respectively, at the APEC Secretariat Policy Support Unit. The views expressed in this paper are those of the authors and do not necessarily represent those of the APEC Member Economies.

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Key Messages

- Remote area development is economic development in the long run. Practically all of today's major cities were once remote areas, and some of yesterday's commercial hubs are remote areas today. The growth and decline of cities reflects shifting economic and trade patterns, changing technologies, and the impacts of policy intervention.

- Although there is no comprehensive and generally accepted definition of remoteness, economies and international organisations have defined remote areas depending on their policy or programme needs. A key element in these definitions is the lack of connectivity whether due to geographic distance, terrain, or travel time.

- Remoteness could be absolute or relative and is not necessarily a rural phenomenon—cities can be considered relatively remote if they are disconnected from economic networks and are unable to tap into economic opportunities.

- Remote areas face many challenges peculiar to their situation. They often suffer from limited physical and communication infrastructure due to geographic isolation and high costs of infrastructure development.

- People in remote areas have poor access to basic services such as education and healthcare. This results in economic hardships in remote areas due to high costs of living and limited job and entrepreneurial opportunities. Remote areas also face challenges related to governance, environmental vulnerability, and community isolation.

- Despite the challenges, many previously remote areas have realised their economic potential and integrated into the wider economy. Some remote areas have tapped into their natural resources and developed into cities with diverse industries. Others have benefited from their location and unique heritage through tourism development and attracting the film industry.

- Setting up special economic zones with business-friendly environments can attract foreign direct investments. On the other hand, investment in road and rail networks—from government funding and through public-private partnerships—can connect remote areas to local supply chains and global value chains.

- While remote area challenges are many, they are not insurmountable. Economies need to develop transportation and communication infrastructure, implement structural reforms, and encourage public and private investments in remote areas.

- Information and communication technologies can be utilised to improve the delivery of health and education services, alleviate the impacts of poverty and isolation, and promote financial inclusion in remote areas. Efforts can also be made to improve governance in remote areas and ensure stakeholder engagement and

ownership of development plans while mitigating environmental and community risks.

- Regional cooperation has a key role to play in remote area development. Economies can share experiences in addressing remote area challenges and mitigating various risks, and APEC's diversity in development level and geography can provide valuable insights. Lessons learned in tourism development and setting up special economic zones will help other economies in their own remote area development and integration plans. Experience has also shown that the building of quality infrastructure leading to the development of economic and trade corridors and trade facilitation can connect remote areas to global value chains.

- Knowledge creation and dissemination is another role for regional cooperation. Work can be done towards defining and measuring remote area connectivity and constraints to growth, with the view of aiding economies in identifying those with high economic growth potential and prioritising infrastructure investments. Toolkits and checklists, along with capacity building activities, will be very useful in promoting cross-border investments in remote areas.

- While remote areas have been discussed in other international fora, this is often in the context of providing assistance or subsides. There is little systematic discussion about the economic potential of remote areas with the view of improving connectedness and making these areas self-reliant. APEC can contribute to remote area development and integration by initiating discussions and actions on economic exploration and tapping the potential of remote areas.

- Remote development is a cross-fora issue. While there aren't many projects directly dealing with remote areas, many of the discussions within APEC are relevant to their development and integration. Issues of connectivity, structural reform, trade liberalisation and facilitation, cross-border investment, infrastructure development, financial inclusion, and e-commerce, among others, are key to realising the potential of remote areas in the region.

DEVELOPMENT AND INTEGRATION OF REMOTE AREAS IN THE APEC REGION

"We anchored in a cove known as Yerba Buena.… The population of the post was about two hundred and fifty men, women and children.… Otters were then numerous in the bay and their skins plentiful…. Trade at that time was practically all barter – tallow and hides, sea otter and beaver skins being the currency."

– William Heath Davis, 1833

I. INTRODUCTION

In 1833, William Heath Davis, an American merchant and shipper, visited the settlement of Yerba Buena.[1] In many ways this settlement was the very definition of a remote area: small population, barter economy, mainly involved in subsistence agriculture and hunting. The fortunes of this settlement changed in 1848 when gold was discovered in the nearby mountains of Sierra Nevada. From a population of 1,000 in 1848, it ballooned to 25,000 in 1850 as workers, merchants, and firms congregated to take advantage of new economic opportunities. Today, this settlement is known as the City of San Francisco, one of the most connected and economically vibrant cities in the world and an epicentre of the digital revolution.

Remote area development and integration is an emerging topic of interest within the APEC region. APEC Leaders,[2] in their 2017 meeting in Da Nang, called for "further collaboration and synergy among various connectivity initiatives and work on advancing economic development and integration of sub-regional, rural and remote areas in the region." This was reiterated in 2018 by APEC Ministers Responsible for Trade[3] who encouraged "further activities to bridge the gap in economic development, including the integration of regional, sub-regional, rural and remote areas."

If one takes a long view of economic history and geography—by long meaning centuries or millennia—one sees that practically all the world's cities were once remote areas. What is remote, and what is a vibrant centre of industry, is in flux. Just as remote areas can become vibrant cities as in San Francisco, today's major population centres and economic centres could be tomorrow's ghost towns due to changing economic environments and trade patterns. Remote area development is the story of economic development in the long-term.

This report aims to improve understanding of remote area issues in the APEC region and to explore avenues for regional cooperation. The next section looks into the various definitions of remote areas that have been used by economies and international organisations and proposes a working definition that can be applied APEC-wide. This is followed by a discussion of the challenges that are peculiar to remote areas, ranging from lack of connectivity and infrastructure to having no scalable markets. After a discussion of challenges, we illustrate some of the development opportunities for remote areas and show that remoteness does not necessarily mean no economic potential. We then look into some

[1] Museum of the City of San Francisco digital archives: http://sfmuseum.net/hist1/early.html (accessed 4 July 2018.
[2] https://www.apec.org/Meeting-Papers/Leaders-Declarations/2017/2017_aelm
[3] https://www.apec.org/Meeting-Papers/Sectoral-Ministerial-Meetings/Trade/2018_trade

options for government and the private sector to overcome remote area challenges, and conclude with a discussion on the possible role of APEC in remote area development and integration.

II. DEFINING REMOTE AREAS

Various definitions for remote areas have been developed in line with policy or programme objectives. For example, a programme aimed at delivering basic services to remote areas will define it in terms of distance or travel time from specific population centres. On the other hand, if the policy objective is to provide subsidies or transfers then remote areas will be defined in terms of development status or income indicators.

Economy-level definitions

Economies have constructed definitions of remote areas that are specific to local requirements and contexts.[4] For example, Indonesia defines remote areas as the districts that are less-developed compared to other districts in the economy. In Papua New Guinea, remote areas refer to geographical locations and populations that are not linked either by air or road transportation and infrastructure, which hinder their access to health and education services and constrain economic development, exacerbating poverty in these areas.

The Accessibility/Remoteness Index of Australia (ARIA) has a five-category classification based on the relative distance to service centres. The categories in the classification include: major cities, inner regional, outer regional, remote, and very remote. The ARIA replaced the initial Rural Remote and Metropolitan Areas (RRMA) system in 2009, which had seven classifications based on population size and distance to the nearest service centre:[5] capital cities, other metropolitan centres, large rural centres, small rural centres, other rural areas, remote centres, and other remote areas.

Malaysia's Rural Grid System has six categories: major urban, secondary urban, urban rural, rural urban, and rural. Classifications are based on the percentage of built-up areas in the region, population size, and distance to the nearest town centre. Thailand, on the other hand, has adopted more a general definition of remote areas based on socio-economic indicators. The key characteristics of a remote area is a sub-district with a population below 7,000, low economic growth, lack of sustaining economic activities to generate income, and low average household income. Most APEC economies do not have a specific definition for remote areas and instead place them under the umbrella of rural areas.

Specific definitions have been developed for the purpose of a particular programme. For example, Japan identifies remote islands and mountain villages as areas in need of assistance for improving connectivity, providing basic services, and protecting the environment and local culture. Chinese Taipei identifies two geographically disconnected areas that are mandated to receive special development assistance: (1) Hualien and Taitung

[4] Unless otherwise indicated, the source for economy-level definitions are from responses to the APEC Questionnaire on Remote Areas Development and Integration. The responses are summarised in Annex A.
[5] Source: SARRAH. (n.d.). Define Remote and Rural Context. Retrieved from Services for Australian Rural and Remote Allied Health: https://www.sarrah.org.au/content/defining-remote-and-rural-context.

counties which are separated from the rest of the economy by the Central Mountain Range and (2) offshore islands which are separated by the sea. Chile's Isolated Localities National Policy describes remote areas as geographically isolated places plagued by connectivity difficulties, limited access to public services, lack of basic service provision, low population density, and spatially dispersed settlements. In 2012, these features were developed to form an Isolation Index. This index is composed of the Structural Isolation Index which measures time taken to get to a destination considering its geographical and access conditions, and the Integration Index which measures access to public services.

Another common way in which remote areas is defined is in relation to accessibility of a specific service such as education or healthcare. According to the Rural and Small Urban Committee of the Canadian Association of Emergency Physicians (1997), rural remote communities in Canada are defined as communities that are 80 to 400 kilometres or 1 to 4 hours of travel time away from a major hospital in good weather. A General Practice Rurality Index for Canada also identifies six variables in its index: remoteness from a basic referral centre and an advanced referral centre, drawing population, number of general practitioners and specialists, and the presence of an acute care hospital (Leduc 1997). To derive the index, each variable is weighted and the values are summed up on a 100-point scale. For Australia, Hays et al. (1994) categorises more than 80 kilometres or 1 hour of travel time from the nearest hospital as rural and more than 300 kilometres or 3 hours of travel time from similar support services as remote.

Cross-economy definition of remoteness

A key challenge in defining remote areas for the purposes of development and integration is that remote areas are heterogeneous; i.e., each economy has a different definition of what a remote area is and what its needs are. That said, international organisations have explored cross-economy definitions of remote areas depending on need and programme requirements.

One example is OECD's definition of a remote area, which provides an overarching framework that may be applicable to multiple economies. OECD (2009) prescribes a typology that classifies regions into three categories—predominantly urban, intermediate, or predominantly rural—based on the percentage of the rural population in that area. However, more recently, OECD (2011) has recognised the need to take the presence of economic agglomerations in the vicinity into account and, as a result, it extended its regional typology to include accessibility as a criterion (Brezzi et al. 2011). Considering accessibility enables a more accurate measurement of remoteness since not only the distance from an urban centre will be taken into account but also the time taken to arrive at the centre. Based on this new criteria, OECD has extended its typology to describe four types of regions: predominantly urban, intermediate, predominantly rural close to a city, and predominantly rural remote. This extended typology classifies a remote area as one where 50% of the population requires at least 45 or 60 minutes of travel time to a centre with at least 50,000 inhabitants for Europe or North America, respectively. The rationale for including travel time in the definition is to be able to take into account barriers to travel without having to specify or assume the type of terrain or transport infrastructure available.

A World Bank study by Kitchen and Slack (2006) defines remote areas as those "characterized by geographic isolation and low population density. Communities tend to

be sparsely populated, and the distance between them is considerable." It goes on to describe remote areas as generally having no publicly provided overland transportation system, having harsher climatic conditions, higher unemployment, and greater dependence on social service programmes.

Looking at the definitions of remote areas provided by APEC members, it seems that a key element in remoteness is the lack of connectivity. Whether due to geographic distance, terrain, or travel time, remote areas suffer from a lack of connectivity in one way or another. Furthermore, remoteness could be absolute or relative and is not necessarily a rural phenomenon—urban areas are considered relatively remote if they are disconnected from economic networks and are unable to tap into economic opportunities.

For this discussion, we propose a working definition of remote areas for the purpose of development and integration as follows:

(1) Remoteness is the lack of connectivity.
(2) A remote area is an area where remoteness is a binding constraint to growth.

Some key parameters to define remoteness can include poor physical connectivity (e.g., long travel time to a city centre) and lack of access to basic services (i.e., access to healthcare or education that is below the economy average).

Defining remoteness as the lack of connectivity lends itself to measurement and cross-economy applicability and is amenable to both absolute and relative definitions. Scientific literature is replete with definitions in the negative—e.g., coldness is the absence of heat; poverty is the lack of choices and income—and, hence, the definition for remoteness can be calibrated based on policy needs. Moreover, local-level definitions of connectivity can be developed based on economy- and subeconomy-level definitions already present in the literature (DHL 2016; ADB 2001).

On the other hand, not all remote areas can be the focus of development and integration efforts, so definition (2) is needed. If there is a need to prioritise, then economies can focus efforts on areas for which remoteness is identified as a binding constraint to growth. Economic literature is rich with diagnostics for identifying constraints to growth (e.g., Hausmann, Rodrik and Velasco 2006), and these techniques could be modified towards defining remote areas in need of development and integration.

III. CHALLENGES FACED BY REMOTE AREAS

While remote areas can be very varied—a village in thick mountain forests will have little in common with a remote island community—they face some common challenges due to their remoteness.[6]

[6] All 14 APEC economies which provided responses to the Questionnaire on Remote Areas Development and Integration indicated that their remote areas face economic challenges due to their relative isolation or distance from other areas (see Annex A).

Limited physical infrastructure

The primary challenge of remote areas is the lack of physical infrastructure, which includes transportation, energy and information and communication technology (ICT) infrastructure. Indeed, remote areas remain remote precisely due to a lack of physical infrastructure that can connect them to the rest of the economy. Remote areas are often isolated by geography or surrounded by difficult terrain which prevent easy development of transport infrastructure and logistical services. This is especially evident in areas that are rugged or mountainous where transportation costs are high. The lack of physical connectivity also increases challenges for logistical operations, which make it harder to ensure access to electricity, water, sanitation, and ICT. Moreover, remote areas face significant challenges in implementing infrastructure projects due to weak economic activity, high costs of freight and passenger transportation, and low level of market demand in the area.

For example, remote areas in Australia[7] account for 90% of the land area and 3% of the population, of which the majority are indigenous communities. The regions suffer from a lack of road access, clean water, and reliable energy and telecommunication services. The low population density makes construction and maintenance costs uneconomical. A study by McAnulty and Baroudi (2010) find major challenges in providing construction services in remote regions mainly due to limited skilled human resources, lack of motivation, cost management difficulties and social issues, among others. The study finds personnel issues to be the most prominent in the remote construction industry.

According to Lawrence (2017), a large part of Papua New Guinea is disconnected and remote. About 22,000 kilometres of roads run through the economy but fail to connect Port Moresby, the economy's biggest city, to the Highlands region which is inhabited by 40% of the population. In addition, challenges in improving the quality of the road networks persists as 75% of the network becomes unusable during certain times of the year.

While access to electricity in remote areas has improved, challenges including the lack of basic services and infrastructure remain (World Bank 2017). Yagos et al. (2017) find that inadequate electricity is a hindrance to the development of ICT in remote and rural Uganda. As a result, renewable energy has been increasingly utilised to meet the energy needs of isolated communities (World Bank 2017; Nouni, et al. 2008). With regard to sanitation systems, UNICEF (2015) notes that rural populations in economies lacking road access have less than half the sanitation coverage compared to rural areas with road access. Overall, a lack of infrastructure, worsened by difficult geographical terrain, can limit economic opportunities for remote areas (Williams 2007).

Poor access to services

Limited infrastructure often leads to populations living in remote areas to have limited access to services such as healthcare and education. Many studies have documented the challenges of providing health services to individuals in remote areas (e.g., Yagos et al. 2017; Burney et al. 2010; Patil 2015; Qiang et al. 2011). A lack of physical infrastructure

[7] Australian Government. (2016). Remote and Indigenous Communities: Australia Infrastructure Plan. Retrieved from: http://infrastructureaustralia.gov.au/policy-publications/publications/files/IA_J16-2330_Fact_Sheet_Remote_and_Indigenous_v1.1.pdf.

such as sanitation makes people living in remote areas more vulnerable to health problems, and improving access to clean water can reduce the spread of infectious diseases (Bailie et al. 2004). Isolation in itself can also make remote communities more prone to disease since isolated populations may not have immunities for some diseases, as was the case with the multiple-wave influenza outbreaks in Tristan da Cunha in 1971 (Camacho et al. 2011). Collectively, these factors pose different types of challenges to addressing health issues in remote regions.

Remote areas also face challenges in delivering education services due to a lack of teachers, insufficient equipment, and limited access to the internet (Shaw 2010). For instance, Rena (2011) notes that despite an increase in student enrolment in both primary and secondary schools, the lack of trained teachers proves to be a constraint to providing education services, particularly so in remote areas in Papua New Guinea. Poor resource distribution and insufficient access to textbooks and other learning materials also contribute to the challenges of education in remote locations. As a result, less than 7% of students receive any form of formal education in the remote highlands of Papua New Guinea. Likewise, Japan's National Institute for Educational Policy Research (NIER) identifies lack of teachers, along with poor building infrastructure and equipment, as education challenges particular to remote and isolated regions, affecting not only access to but also quality of educational services in these regions (NIER 2012).

Utilising ICT to address the lack of health services has commonly been suggested as a solution. For instance, m-health, a mobile health services application, enables the tracking of treatment and on-the-phone medical consultation and support when reaching health workers is costly. Qiang et al. (2011) conducted case studies on Haiti, India and Kenya's m-health systems to find significant improvements in health service delivery. However, the application's lack of interoperability with mobile phones as well as inflexibility in regulations pose challenges for large-scale implementation of the application.

Limited economic opportunities

A key challenge for remote areas is the lack of scale economies. Kitchen and Slack (2006) find that remote areas lack markets of sufficient size that could potentially benefit from economies of scale. Instead, they have small or no markets, reducing the incentive for setting up businesses. Hence, limited market size in remote areas directly limits their set of economic opportunities. Moreover, a small market means only a small number of firms—often just one firm—can operate in remote areas, which has implications on developing market competition.

Remote areas often rely on informal economic activities since they do not produce enough formal sector jobs to employ their residents. Goldsmith (2008) notes that informal economic transactions involving the exchange of services between family and neighbours are extremely valuable in the Alaskan economy. Vulnerable employment is also common in industries where people are seasonally employed, as is the case for salmon fishing in Alaska (Goldsmith 2008). Likewise, OECD (2009) notes that more than half of the employed population of remote areas in New Zealand is involved in agriculture, forestry or fishery, all of which consist of seasonal work.

Studies in the Sierra Madre Mountains in Mexico (Miranda et al. 2016) and the mountainous regions of Nepal (Li 2017) show that many residents in remote areas are dependent on subsistence farming for economic survival. Likewise, 9% of the Inupiat households in Northern Alaska were involved in subsistence activities in 2006 (Goldsmith 2008). The lack of access to financial services and capital is a fundamental challenge preventing change. Bunce et al. (2009) affirms the difficulties of shifting from a subsistence economy due to limited availability of credit, capital, and land rights in the remote, volcanic island of Rodrigues, Mauritius.

Remote areas are also likely to lack diversity in economic activities or employers, making them especially vulnerable to economic shocks. For instance, on the Pitcairn Islands, the economy is mainly dependent on the sale of postage stamps and honey (Amoamo 2013), while on the Socotra archipelago animal husbandry and fishery are the main industries (Scholte et al. 2011). Natural resources available are therefore highly susceptible to over-exploitation. In the case of Rodrigues Island, Bunce et al. (2009) reports that the rules guiding the use of natural resources often had little impact due to poor delineation, enforcement and corruption. As a result, the island suffered from a loss of biodiversity, deforestation and degradation of the lagoon fishery industry.

A limited number of economic activities also means that individuals who are not properly skilled for a specific industry are left out of the economy. Goldsmith (2008) notes that many Alaskan residents remain unemployed because their skills do not match the requirements of local employers.

Lack of human capital

One of the common characteristics of remote areas is high unemployment (relative to the economy in general) and fewer job opportunities on the horizon (Kitchen and Slack 2006). Hence, workers in remote areas tend to move to urban regions for better opportunities, leaving a shortage of skills in their place of origin.

Professionals who work in remote areas also experience professional isolation, which can hamper career development and employment opportunities (Paliedelis et al. 2012). Inadequate access to formal education along with the lack of mentors to guide new graduates invariably impact confidence and opportunities for advancement, causing skilled workers to leave rural and remote areas to access better opportunities. In fact, Paliedelis et al. (2012) found that doctors, nurses, and supporting medical professionals leave rural services due to professional isolation and lack of access to continuing education.

The outward movement of skilled workers for better opportunities creates a vicious cycle of poverty within remote regions. The departure of workers, often those who are skilled and young, results in faster ageing in remote areas as well as lower output, leading to lower income and purchasing power and even more worker flight (Kuwahara 2012; UNECE 2017). Over time, the region becomes increasingly poor and vulnerable.

High costs of living

Geographical isolation, high transportation costs, inefficiencies, lack of competition, small local markets, severe climates and insufficient physical infrastructure all contribute to high costs of living in remote areas.

In Alaska, severe climate contributes to higher living costs by hindering logistical operations (Goldsmith 2008). In remote areas of the United Kingdom, living costs were found to be 20% higher compared to urban areas (BBC 2010). In Australia's Northern Territory, the cost of food and beverages in remote stores have been found to be on average 60% more expensive in supermarkets in Darwin (Ferguson et al. 2016). Fuel prices have also been found to be more expensive on the Torres Strait islands than in mainland Australia (House of Representatives, Aboriginal and Torres Strait Islander Affairs Committee 2009).

Communication and transportation costs are also often higher in remote areas. In Kiribati, particularly the Outer Islands, telecommunication costs are high due to limited signal or internet connection. Even those with access to network coverage cannot afford to make phone calls. (World Bank 2012). In remote areas of Kupang, Indonesia, residents are required to use *ojek*, or personally rented motorbikes, at a high price due to a lack of roads and public transportation (Rokhim, et al. 2016).

Governance challenges

A key challenge for remote areas is an insufficient tax base due to low population densities and few formal sector firms. Moreover, high costs of living result in larger per capita government expenditure (Kitchen and Slack 2006). Hence, many remote areas tend to rely heavily on external aid for financial assistance—whether in the form of cross-regional subsidies or official development aid from foreign institutions—to deliver government services. An example is the Pitcairn Islands where only 11% of the annual local government budget of GBP 2.1 million is derived from domestic revenue (Amoamo 2013). Likewise, Tokelau, an island economy in the South Pacific Ocean, mainly subsists on external financial assistance. With a population of less than 1,500 people, this remote island relies on the financial support of several international and regional partners, including Australia, New Zealand, UNDP, and WHO. Around 60% of Tokelau's government revenue is reportedly provided by the New Zealand government. (Tokelau National Statistics Office and PARIS21 2015).

Another challenge for some rural areas is institutional inefficiencies stemming from their relative isolation from the rest of society. For example, in the Northern Territory of Australia, policy directions and interventions from the South—where Canberra and major cities such as Melbourne and Sydney are located—are not always a good fit for local situations, while local governance systems remain fragmented and poorly coordinated, making the task of forming integrated policies more challenging (Dale 2013; Howitt 2012). Botswana's Remote Area Development Program (RADP) failed due to a lack of institutional reforms to transform the government's colonial structures. The RADP was initiated with the aim of addressing the marginalisation of the Basarwa people but was unable to do so, which resulted in their dependency on welfare, limited rights to land and natural resources, poor political representation, and exclusion (Nthomang 2004).

Remote areas, particularly those with ethnolinguistic minorities, could also face political and social isolation. Kuwahara (2012) reports that residents in Japan's remote islands experienced restricted voting rights, compulsory cultural education, and limited autonomy until the late 1940s. Political and social isolation can have a persistent negative impact on people living in remote areas, as in the case of the Ainu people in the north of Japan. In 2012, only 17.3% of Ainu people had tertiary degrees (compared to 45.2% in the general population[8]) and 38.3% received welfare support, which is more than three times the average rate in Japan (Okada 2012).

Lack of data and information is another challenge for effective governance in remote areas. Remote areas often lack proper data collection capacity and are unable to provide socioeconomic data to inform investment decisions and policies. Esoko (2017), an information and communication service for African agricultural markets, listed difficulties in deploying and implementing data collection technologies in rural and remote settings: difficulty of finding individuals who are willing to work in rural settings, limited accessibility of remote communities, unreliable electricity supply, and lack of mobile connectivity. In another study, Elahi (2008) reported the challenges of data collection in developing economies, some of which are applicable to remote areas. These challenges include lack of literacy in some communities to understand the importance of data collection, cultural constraints within rural and tribal societies concerning sharing of information with outsiders, large informal economies which contribute to statistical measurement difficulties, and poor accounting capacity even within the formal economy. Limited data and lack of resources to gain market intelligence are also hindrances for business growth, as has been the case for the Pitcairn Islands (Amoamo 2013).

Environmental vulnerability

Remote areas are often vulnerable to climate change. This is particularly the case for small island economies where there is little geographic protection from typhoons or rising sea levels. In Kiribati, climate change is already threatening livelihoods and economic prosperity. Estimates show that in a few decades Kiribati's causeways will be washed away and its coral reefs would be irreparably damaged, disrupting both the economy and food supply. Additionally, increased rising sea levels will worsen erosion and create a further shortage in freshwater supplies. Kiribati has one of the lowest GDP per capita incomes in the world and is facing issues including high unemployment, infant mortality, and prohibitively expensive costs of living (Ives 2016).

Historically, the Pitcairn Islands have also been significantly impacted by natural disasters. In the 1800s, drought and crop failure brought on two mass emigrations. Similarly, on Rodrigues Island in Mauritius, crop pests, cyclones and a vicious cycle of deforestation caused by over-grazing, soil erosion and drought were noted by Bunce et al. (2009). In the aftermath of these subsequent natural disasters, a significant population was reported to have relocated to the main island, which exacerbated other issues on the island including population decline and loss of human capital.

The Chittagong Hill Tracts (CHT), a remote region in Bangladesh, has also been facing more natural disasters. In June 2017, heavy landslides due to torrential rains devastated

[8] Percentage of Japan's labour force (15 years old and older) with advanced education; data from ILOStat.

villages, agricultural lands, and infrastructure. For remote areas such as the CHT, which are experiencing deforestation and land erosion due to illicit cultivation of rubber and tobacco, climate change can be a significant challenge. Considering CHT's already underdeveloped state, natural disasters only add to the vicious cycle of poverty, continued lack of adequate infrastructure and access to vital services (Ahmed 2017).

Environmental vulnerability coupled with poor infrastructure and high logistics costs mean that remote areas are less able to cope with the impacts of natural disasters and extreme weather events.

Community challenges

The Asia-Pacific region has many minority groups which are not only geographically isolated, but also economically disadvantaged. According to the United Nations (2010), indigenous peoples make up around 370 million of the world's population (around 5% of total) and constitute around one-third of the world's 900 million extremely poor people.[9] The isolation of remote areas can contribute to challenges of assimilation. Communities in remote areas, especially if they are ethnolinguistic minorities with distinct cultures and religions, may strive to protect their unique culture from outside influences. Furthermore, accidents of geography and history can pose challenges to engagement and effective governance.

Several challenges exist in the ability of indigenous communities to participate in business activities. Apart from the challenges that generally affect poor and rural communities, social stigma and bias are challenges that are peculiar to indigenous communities in remote areas. Jacobs (2017) notes widespread negative attitudes towards the ability of indigenous people to perform well in businesses. This results in trust issues in indigenous suppliers, low expectations from contracts tendered by them, and the tendency to associate indigenous businesses as only fitting for cultural activities. Negative perceptions of people in remote areas can limit their ability to engage economically with the greater society.

As remote areas may be isolated from other areas by geography, close social ties and cohesion within a given remote area may be particularly important for survival. This can mean the development of unique social interactions. For instance, Schreier (2003) found changes in the English used in Tristan da Cunha due to its isolation. This provided a sense of unity and uniqueness among the locals but made it harder for communication with outsiders. Schreier noted that while language in isolation can indicate a nostalgic reference to a simple lifestyle, it can also signal backwardness and conservatism of a community. Thus isolated social cohesion may make it doubly challenging for communities in remote areas to be integrated into the mainstream society.

IV. OPPORTUNITIES FOR REMOTE AREAS

Remote areas, while relatively isolated and disconnected from the mainstream economy, may be hiding economic opportunities waiting to be tapped. As illustrated in the case of San Francisco, remote areas may be one discovery away from being transformed into a

[9] State of the World's Indigenous Peoples. Press release, 14 January 2010. Retrieved from: http://www.un.org/esa/socdev/unpfii/documents/SOWIP/press%20package/sowip-press-package-en.pdf.

major economic hub. This section provides some examples of how remote areas have been transformed by economic exploration and investment.

Resource extraction

Abundant natural resources provide a growth opportunity for remote areas. San Francisco's resource-based development story[10] is a famous example. The California Gold Rush of 1849-1855 transformed what was then the remote settlement of Yerba Buena, with a population below 1,000, into the bustling city San Francisco is today. It began with the discovery of gold flecks at the foothills of the Sierra Nevada Mountains, news of which quickly spread all across the United States. The arrival of gold seekers in thousands flooded nearby towns which included present-day San Francisco and Sacramento. As a result, San Francisco's population grew to 150,000 in a span of five years. The subsequent development of the mining industry led to large investment inflows. Migrant workers pushed for better transportation and communication networks to keep in touch with their families, leading to the development of new roads, railroads, bridges, and mail services. Identifying the opportunity for providing financial services, banks such as Wells Fargo and Co. were established. Jeans manufacturer Levi Strauss set up in San Francisco after recognizing the need for sturdier pants for gold miners. According to Whaples (2008), California's gold production in that decade totaled to USD 550 million, accounting for 1.8% of the United States' GDP. The Gold Rush turned California into a Pacific market hub and San Francisco into a bustling city.

Johannesburg[11] is another example of a remote area that developed due to natural resource extraction. In 1886, gold was discovered in the town of Langlaagte in northeastern South Africa. Although the region is already known to have gold deposits, this discovery was unique due to the large amounts of gold present in the ore. Development of this resource eventually led to the formation of Johannesburg in 1886. From a population of 600, the town grew to 102,000 people by 1895. Fifty-two mining companies established operations in the region by 1889, attracting the development of other complementary services. Improved transport services were developed to meet the demands of the mining companies and new neighbouring communities. This improved not only the functioning of the mining industry but also other businesses, such as farming, since it was now easier to transport produce to larger towns. Consequently, this led to the agglomeration effects with many allied industries, such as the financial industry, growing in Johannesburg at the prime of the mining boom and even surviving the decline of the mining industry (Harrison and Zack 2012).

What gold was to San Francisco and Johannesburg, coal was to Pennsylvania[12]. The formation of coal in Northern Pennsylvania began with the Appalachian Revolution, a process that raised mountains causing them to split open and thrust up rocks. The extra pressure during the revolution turned Pennsylvania's prehistoric forests into anthracite coal that was purer, harder and higher in carbon content. To support the heavy coal industry, first canals and later railroads were developed to transport coal from the mountainous

[10] Source: Norwich University. Retrieved from: https://online.norwich.edu/academic-programs/masters/history/resources/articles/historical-impact-of-the-california-gold-rush.
[11] Source: South African History Online. Retrieved from: http://www.sahistory.org.za/article/discovery-gold-1884 and http://www.sahistory.org.za/archive/gold-rush.
[12] Source: Explore PA History. Retrieved from: http://explorepahistory.com/story.php?storyId=1-9-B.

regions to the markets. According to Marsh (1987), railroads became an important part of the economic life and would successfully draw in international financing. Villages were built at the opening of each remote mine and permanent towns developed near the railroads. In the coal industry's heyday, there were 175,000 coal workers supporting a million people in the region. The county seats of Scranton in Lackawanna and Wilkes-Barre in Luzerne are among the many cities that grew out of the anthracite coal extraction industry in Pennsylvania.

Film industry

Media plays an influential role in highlighting the remote, natural wonders of the world to millions of people and can impact individuals' perceptions of a destination they have never seen before (O'Connor, et al. 2010). Hence, remote areas can benefit significantly from film production without substantial initial investment. In fact, filming in remote areas can be a launch pad from which investments in tourism and infrastructure can begin. Studies have shown that film tourism can increase the number of visitors, and often leads to a rise in revenues and employment (Riley and van Doren 1992; Tooke and Baker 1996; Hudson and Ritchie 2006).

New Zealand and the *Lord of the Rings* trilogy is one of the most successful examples of film tourism. The majority of the films were shot at remote locations, which are now major tourist destinations. New Zealand experienced a 50% increase in inbound tourism since the films were released and brought in nearly NZD 33 million a year (Pinchefsky 2012). Another study shows that as of 2014, *The Hobbit* trilogy increased the number of tourists by over 100,000 and added nearly USD 800 million to the economy in international tourist receipts and generated a welfare gain of nearly USD 200 million to households (Li et al. 2017). Recognizing the long-term benefits of film productions, the New Zealand government has provided a special grant for international productions that manage to generate economic benefits to the economy (Li et al. 2017).

Another remote area that has become a popular tourist destination due to the film industry is Koh Phi Phi Island, Thailand, which hosts Maya Bay where *The Beach* was filmed. Similar to the *Lord of the Rings*, *The Beach* has contributed to the branding of the destination as an exotic, tropical paradise, and enabled its small fishing village to develop into a tourist attraction. Filming the movie in Maya Bay is said to have injected an estimated USD 13 million to the Thai economy, and this is excluding all economic benefits received after the filming (Law et al. 2007). According to recent numbers, the Hat Noppharat Thara-Mu Koh Phi Phi National Park welcomed 1.38 million visitors in 2016, which rose to 1.65 million in 2017 (Wipatayotin 2018).

A combination of media influences may have allowed for Koh Phi Phi Island to develop substantially. Prior to *The Beach*, there were other classic movies that were filmed in Maya Bay including the James Bond movie, *The Man with the Golden Gun* and Renny Harlin's *Cutthroat Island*. Moreover, there had already been various nature documentaries filmed there and may have set the tone for further film tourism development. Furthermore, TV shows such as *Survivor* along with various other films may have spawned a general interest in travel to Thailand along with other parts of Southeast Asia (Law et al. 2007).

Remote areas of the United Kingdom have also been able to benefit from popular films. This is the case of Northumberland, which is known for its moorlands and was historically a frontier zone between England and Scotland. Today, much of the region is a part of the Northumberland National Park and is the least densely populated county in England with only 63 people per square kilometre (Northumberland County Council 2015). Due to a popular book and movie series, *Harry Potter,* as well as a TV series, *Downton Abbey,* many visitors have been visiting Alnwick Castle located in Northumberland. As of 2016, more than 250,000 visitors per year visit the castle and, in 2014, day-visits from tourists were estimated to be worth GBP 4.3 million (McVeigh 2015). A study based on visitor surveys of eight film locations throughout England, including *Harry Potter*, showed that on-screen-induced tourism contributed approximately GBP 140 million to the economy as of 2014 (Creative England 2015).

Special Economic Zones

Since the first Special Economic Zone (SEZ) was established in Brooklyn, New York in 1937 (World Bank 2017), the SEZ has been recognised as a way to stimulate economic growth. Since then, 135 economies have developed approximately 3,000 SEZs around the world, accounting for over 68 million jobs and USD 500 billion of value added (Farole 2008; Wang J. 2013). An SEZ is defined as an area with special privileges aimed at attracting foreign investment in a given economy. These privileges may include special policies, regulations, or infrastructure development support (Bernsein 2012). A wide variety of businesses can also be promoted under an SEZ such as manufacturing, commerce, agriculture, tourism, and services.

Some SEZs have successfully developed from remote areas. An example can be found in China: in the late 1970s, approval was granted to open SEZs in Shenzhen, Zhuhai and Shantou in Guangdong Province, and in Xiamen in Fujian Province. These SEZs were experiments in liberalisation of trade and other policies, which were then applied to other parts of the economy. In 1984, due to the initial success of the first group of SEZs, the experiment was expanded to 14 other cities (Wang J. 2013). Estimates show that the establishment of SEZs in China increased FDI per capita by 58% and increased total factor productivity by 0.6 percentage points (Wang J. 2013).

Shenzhen, the first SEZ established, is China's most successful case. In 1979, before the town developed into an SEZ, Shenzhen had a population of 30,000 (Yeung 2009); today the city's population is more than 12 million. Between 1979-2006, GDP per capita increased 142 times from CNY 606 in 1979 to CNY 86,200 in 2006 (Mah 2008). Today, Shenzhen is one of China's most productive cities and is home to ICT giants including Tencent and Huawei (Sun 2018). Factors that have likely impacted the success of the Shenzhen SEZ include its strategic location and proximity to Hong Kong, China and substantial investments in infrastructure (Mah 2008). Due to its success, the Chinese government is attempting to emulate similar results in other remote areas such as Kashgar, located in the Xinjiang Uyghur Autonomous Region, which can link to trade corridors towards Central Asia and onto Europe (Chou and Ding 2015).

Indonesia has also developed a successful Free Trade Zone (FTZ), which is a specific class of SEZ, on Batam, Bintan, and Karimun islands (BBK). In 1970, a master plan was developed for Batam to become an industrial and commercial hub for Indonesia (KPMG

Peat Marwick 1991). In 1971, the government designated Batam as an industrial zone, which paved the way for the island being designated an FTZ in 2004. Following the FTZ designation, Batam was declared a bonded zone, or a duty-free export processing zone, to support export-oriented industries (Wong and Ng 2009). With the development of the FTZ in 2004, BBK is now a part of the Indonesia-Malaysia-Singapore Growth Triangle (IMS-GT), a sub-regional partnership that combines the strengths of the three economies to attract more investment. Over the years, BBK has seen benefits: as of 2009 the Batamindo Industrial Park and Bintan Industrial Estate have attracted nearly USD 1.7 billion worth of investments and employed 80,000 Indonesian workers. The population in Batam also expanded from 43,000 in 1983 to 724,315 in 2007 (Wong and Ng 2009). Currently, the government is planning the transition of Batam from an FTZ to an SEZ, which is estimated to be completed in 2021 (PWC 2018).

Similar to Shenzhen, the BBK FTZ has been successful largely due to its strategic location at the intersection of major shipping routes. Batam's proximity to Singapore provides Singapore-based firms with an option to lower manufacturing costs and has been developed as an extension of Singapore's production base. Moreover, BBK has invested in developing its infrastructure and connectivity, linking them to Malaysia and Singapore through air travel and high-speed ferry services (Wong and Ng 2009).

In the case of Russia, SEZ projects have been incorporated into the economy's overall development agenda to grow disadvantaged regions including remote areas. Russia has designated certain areas as "territories of priority socio-economic development" (TPSED), which is similar to SEZs in that tax incentives are implemented in addition to simplified administrative regulations to attract investment. However, TPSEDs also have a dual objective of improving local livelihoods apart from attracting investments. Currently there are 33 SEZs and 12 TPSEDs in Russia, with plans to expand the number of TPSEDs to 45 in 2020 (Beliakov and Kapustkina 2016).

One remote area that has been designated a TPSED is the Kamchatka Peninsula, which is located in the Russian Far East. The area is famous for its large volcanic belts, which have been designated a UNESCO World Heritage Site[13]. Beliakov and Kapustkina (2017) find an increase in per capita income in Kamchatka Peninsula after the TPSED was implemented. According to the study, TPSEDs are more effective in bolstering regional development than SEZs, and other economies may consider implementing programmes similar to TPSED in conjunction with more traditional SEZs as a method of effectively developing remote areas.

In Russia, many of the SEZs located in remote regions have been declared specialised tourism SEZs due to their natural beauty and abundant biodiversity, such as the Baikal region in Southern Siberia. In addition to housing the world's largest freshwater lake, which was designated a UNESCO World Heritage Site in 1996, Lake Baikal houses one of the world's richest and unusual freshwater fauna which is unique to the region due to its isolation.[14] As in the case of Baikal, tourism and recreation SEZs may be particularly effective for remote areas with limited infrastructure.

[13] Government of Kamchatka. Retrieved from: http://zakaz.kamchatka.gov.ru/en/index.php?cont=3
[14] UNESCO. Retrieved from: http://whc.unesco.org/en/list/754

Tourism

Tourism development can play an important role in remote area development and integration. A study among APEC economies has shown that tourism has strong linkages with inclusive growth due to relatively lower entry costs, employment of low- and mid-skilled labour, and greater participation of MSMEs (San Andres, Cheok and Othman 2016). Furthermore, many remote areas have unique competitive advantages due to unspoilt natural beauty and unique cultures which may appeal to a certain travellers. Indeed, remoteness could be a plus for tourism and interest in remote area tourism has been increasing for travellers seeking unique, pristine, and impressive landscapes. Studies show that "remoteness sells" and the value of remote places may be growing because of their increasing scarcity (Wildlands League and Ontario Nature 2012; Butler 2002; Cohen 2002). Additionally, tourism can provide alternative livelihood in regions that have limited alternative economic opportunities.

Box 1. Developing Remote Areas into Tourist Sites

When considering the opportunities for tourism in remote areas, it is helpful for economies to know how to identify the competitive potential of particular locations. Not all remote areas have equal potential for developing a successful tourism industry. Extensive research has been conducted around defining competitive advantage in the tourism industry through the use of models and indicators. For instance, Heath's (2003) model follows the metaphor of a house, with its foundations being the basis for competitiveness. According to Heath, generally speaking, a key portion of competitiveness are the "Key Attractors," which include heritage, culture, events, entertainment, climate, etc. (Heath 2003).

An integrative model on destination competitiveness categorises resources into two core types: Endowed and Created (Crouch and Ritchie 1995). Endowed Resources are defined as natural features (e.g. mountains, beaches, or lakes) or related to heritage and culture (e.g. customs, cuisine, beliefs, history, or arts). Created Resources, on the other hand, are not formed by geology or history but by deliberate public or private sector action (e.g. tourism infrastructure, entertainment, special events, and shopping). Beyond resources, another complimentary category, Supporting Resources, refers to other factors that help bolster a tourism industry such as general infrastructure, quality of service, accessibility, and market ties. Another relevant category is Situational Conditions (e.g. economic, political, legal, governmental, regulatory, demographic, cultural, and social influences) or external factors that shape how business is conducted in a region.

Remote areas would likely depend on Endowed Resources initially for tourism development because Created Resources require some capital to develop. A remote area would then be able to expand and scale-up via Created Resources at a later time. As a result, at the very initial stages of tourism development there may be a strong draw based on attractive Endowed Resources such as historically significant sites or beautiful natural landscapes. Nonetheless, both Endowed and Created Resources form the primary attraction and motivation for tourism to flourish and that Supporting Resources provide the foundation from which the industry can begin to expand (Crouch and Ritchie 1999).

For example, in the case of Ittoqqortoormiit, Greenland, tourists are drawn to the Arctic landscape and activities including dog sledding, sailing, and hiking. Another draw is the Northeast Greenland National Park, which borders Ittoqqortoormiit. The economic situation of Ittoqqortoormiit is similar to that of other places in the Arctic region, with high unemployment, low incomes, and outward migration. The main sources of income are hunting, seasonal tourism, and social assistance. As of 2013, the average monthly income for a hunter was EUR 1,350-2,000 whereas for hunters offering dog sledding tours, an average of EUR 135,000 was earned for an entire tourism season (Tommasini 2013). Bolstering the tourism industry would allow Ittoqqortoormiit to become less dependent on subsidies and offer many individuals with the potential of a better livelihood.

Another remote area that has benefitted from the development of tourism is the Yukon Territory in Canada. The Yukon is one of the remotest regions in Canada with a population of 30,000 in an area the size of California. The territory is abundant in Endowed Resources, which include wildlife, healthy ecosystems, pristine waterways, and a rich history of the First Nations people. This is also an area that once thrived as a mining region and declined after the Klondike gold rush in 1898. In recent years, tourism is viewed as a viable alternative industry for rural towns that have faced boom and bust cycles in resource extraction. Some even argue that the first wave of tourism in the region actually began with the gold rush. The second wave of tourism is said to have resulted from the completion of the Alaska Highway, which connects Alaska to the rest of the continental United States (Barre 2013). As a result, the Yukon's tourism industry has also benefitted from Supporting Resources (e.g. infrastructure). Today, tourism provides 70% of the income of businesses (Teresa and Talrico 2002).

Ontario, Canada, which houses one of the world's largest boreal forests, has also benefitted from the development of remote tourism. More specifically, the region has been able to introduce Resource-Based Tourism (RBT), which relies on pristine waterways, intact forests, and plentiful wildlife to attract tourists. This includes different types of tourism including ecotourism, adventure tourism, and nature-based tourism. Activities offered in RBT include fishing, hunting, canoeing, hiking, viewing wildlife, camping, and water sports. RBT operations can be divided into three categories based on accessibility: remote, semi-remote, and road-accessible (Haider, et al. 1998). Remote tourism is extremely dependent on natural resources to allow for abundant wildlife and pristine vistas. As a result, the lack of roads may actually be beneficial for the preservation of these operations. On a regional level, RBT has played a significant role in the north-western Ontario economy: RBT has provided nearly 10,000 jobs and CAD 306 million worth of economic activity. As of 2005, approximately 25% of RBT businesses in northern Ontario were in remote areas (Lawson and Burkhardt 2005). As a result, in the case of Ontario's boreal forests, remoteness is viewed as an asset and a competitive advantage. Particularly for developing economies, RBT may be considered as a strategic development initiative as it is a high revenue generator, would require less infrastructure investment, and there clearly is a market and demand. Furthermore, the demand may increase as the availability of remote areas in other parts of the world continues to shrink.

Heritage and cultural assets also allow remote areas to develop successful tourism industries, as was the case for Bali, Indonesia. Today, Bali is one of Southeast Asia's most visited destinations and relies on cultural tourism as its major tourist attraction (Knight, et al. 1997). The unique Balinese way of life and culture, from its ceremonies and artistic expressions, are a source of fascination for travellers. Bali's coastal areas are also rich in

beaches, coral reefs, and mangroves, which has allowed for resort areas to develop in areas such as Sanur, Kuta, and Nusa Dua. The construction of resorts has also allowed for Created Resources to be developed, including various recreational facilities and activities. Supporting Resources, such as the construction of Ngurah Rai International Airport in 1970, have also helped strengthen the tourism industry through ease of travel. Although tourism in Bali began as early as the 1920s, it was not until the 1970s that tourism began to truly boom (Chin, et al. 2015). International arrivals increased exponentially after the opening of the international airport: in 1970 there were 30,000 foreign visitors and by 1994 this number increased to 1.5 million. This surge contributed significantly to employment and regional GDP: in 2012, tourism contributed more than 65% of regional GDP at approximately USD 10.5 million (BPS 2013) and in 2009 tourism employed approximately 60% of the island's labour force (Picard 2009).

An example of the role that Created Resources can play in promoting the development of remote areas is Birdsville, Australia. Birdsville is a remote town located in the Diamantina Shire, west of Queensland, at the intersection of South Australia and the Northern Territory. Birdsville originally served as a customs depot and toll booth in 1881 for moving livestock between South Australia and Queensland. However, the depot closed in 1901 causing significant population outflows. Today, one of the biggest industries in Diamantina Shire is tourism, largely due to event tourism and its proximity to the Simpson Desert National Park. The Birdsville Races is an example of how events can play a pivotal role in economic development and strengthen remote tourism. Inaugurated in 1882, the horse races have become an iconic attraction for Australians and international travellers. Today, it receives extensive media coverage and has allowed Birdsville to epitomise the Australian outback. Birdsville has also been able to attract government funding for the event to make it even more appealing to travellers. Events can help enhance a destination's image, attract visitors, and extend average length of stay (Buultjens and Cairncross 2015). Buultjens and Cairncross also show that events hosted in remote destinations may be able to provide benefits to surrounding and en-route locations.

However, there are some caveats to remote areas tourism. According to Schmallegger and Carson (2010), tourism in remote regions particularly around Endowed Resources face the risk of overexploitation. Tourism experiences in remote regions often revolve around natural resources and one or several iconic attractions, whether it be a rare wildlife species, mountains, or a lake, there is a risk of overexploitation. Without any regulations, this may diminish the value or threaten the existence of that natural resource and "pull factor" in the first place. The challenge, however, is that visitors often view these resources as public goods and thus believe they should be freely accessible to everyone (Nilsson 2000). In light of the above, sustainability should be considered when it comes to the development of remote tourism.

Tourism in remote areas may also face the issue of lack of diversification. If tourism is predominantly built around a single attraction, without engaging visitors with alternative activities, remote areas may experience higher tourist turnover, shorter stays, and low rates of repeat visitation. This ultimately means local economies would benefit less in the long run. This challenge could be exacerbated if a remote area experiences extreme weather events or its attractions are highly dependent on seasonal phenomena (e.g., snowfall in the case of skiing resorts), which would limit tourist inflows to certain times of the year.

Some of the above challenges are present in the case of Central Australia, which is a remote destination located at the southern part of the Northern Territory. The main attractions in the region include Uluru, Kata Tjunta, and Watarrka, which dominate all tourist visits in the area. Although Central Australia has the highest proportion of international visitors in Australia, the tourism industry is marked by extremely low numbers of repeat visitors and shorter stays (Carson 2007). As a result, Central Australia has become a "tick and flick" destination where visitors come to view the major sites and leave soon after. The business model of standard tour packages also ensures that big external companies from other tourist hubs outside the region, rather than local businesses, dominate the market. Therefore, local aboriginal communities have not benefitted from the tourism industry boom. According to Schmallegger and Carson (2010), Central Australia is experiencing a bust period and in the long term single-industry tourist towns will be vulnerable.

Box 2. Tourism Development in Maui

The development of Maui, the second most visited island in Hawaii, attests to the critical importance of Endowed and Supporting Resources in tourism development. Although Hawaii is one of the most remote archipelagos in the world, Maui has managed to become an international tourist destination. The greatest Endowed Resource for Maui is the Haleakalā Crater, an active volcano. Since the early 1800s, travellers have been visiting the crater, which boasts impressive, expansive views. In the early 19th century when air travel was not yet established, the sensation of being above the clouds was unique, which helped to further distinguish Maui as a destination (Duensing 2009).

The Hawaii government's decision to invest in Supporting Resources via the development of basic infrastructure including sea transport, a railway, and major roads helped to further expand tourism inflows. In particular, the construction of the Haleakalā Highway, which helped connect the rest of the island with the crater played a significant role in increasing visitor numbers: by the end of 1935 when the highway was in use there was a 455% increase in visitor arrivals over one month (Duensing 2009). As a result, tourist attractions, including Haleakalā Crater, which previously had to be reached by foot or by horseback, were more easily accessible. Further development of infrastructure also helped boost the livelihoods of the local community by promoting commerce, increasing mobility, and enhancing communication.

Today, Maui is a popular holiday destination with a highly developed tourism industry boasting miles of beaches, lush rainforests, and luxurious resorts. Over the years the island has seen an upsurge of tourists. In 2016 the number of average visitors hit a record of 220,000 tourists a day with total spending reaching USD 15.7 billion (Mayor's Office of Economic Development Maui County 2016). Maui is a prime example of a remote destination that was able to capitalise on Endowed and Created Resources while simultaneously investing in Supporting Resources such as road, rail, and sea transport infrastructure to encourage the further development of the tourism industry.

Trade corridors

Trade routes, railways, and road networks have played a significant role in promoting economic growth and prosperity. Open and quality infrastructure promotes trade, boosts

local businesses, gives workers access to jobs, and creates opportunities for remote and rural areas. Infrastructure building in itself can also create jobs in building and maintenance. Building rail and road infrastructure connecting remote areas to the greater economy will allow economies to further prosper by ensuring adequate access to supply chains and enable the efficient movement of goods and services. This would also allow for the economic activities of different regions, including remote areas, to access supply chain networks (Xueliang 2008).

Trade corridors have played an important role in remote area development, connecting trading partners and promoting mobility across various regions and landscapes. Two examples of early trade corridors are the Silk Road and the Incense Route. These trade routes are testaments to the positive spill-over effects[15] of infrastructure development on remote areas. Along these routes, where goods, agricultural products, and technology were transported, clusters of urban spaces flourished even in harsh and remote environments.

The ancient Silk Road, which stretched from China, India and the Middle East into Europe, played a significant role as a trade corridor. While the route was primarily formed to facilitate trade, it also transformed various isolated regions along its path and facilitated the spread of cultures, experiences and knowledge. Fedorenko (2013) notes the opportunity that arose for the economies located along its path, especially the landlocked Central Asian economies where the splendour of Bukhara and Samarkand in doubly landlocked[16] Uzbekistan is testament to the economic opportunities of being along a trade corridor. Likewise, the town of Xinjiang, China, despite being in one of the most remote regions, reaped the benefits of being dotted along the Silk Road (Rudelson 1998). Their prominent location led to the commercialisation of the arid Turfan region in Xinjiang. According to Hansen (2005), the overall impact of the Silk Road on the economy of Turfan is not clear but the Silk Road undoubtedly had spill-over effects leading to the monetisation of the economy. Also, although most oases along the Silk Road have long perished, some continue to exist and are evidence of the Silk Road's powerful economic influence.

The 2,000 kilometre-long Incense Route was another historic and influential trade corridor, which connected the Mediterranean with trading partners surrounding the Arabian Sea through an overland trade corridor. A large portion of the route crosses Negev, a remote desert and semi-desert region. As a result, populations migrated to the region and began living along the route, building roads, and organizing communities, which led to the formation of new communities (UNESCO 2005). The Nabataean people, the native population of Negev, found their strategic location helpful in building a kingdom with a developed administrative system. UNESCO (2005) notes that the profitable trade of frankincense and myrrh among the four Nabatean towns of Haluza, Mamshit, Avdat and

[15] Studies have examined the impact of remote or rural road and railway transportation infrastructure networks on economic growth. Although many of them affirm and reveal a positive impact, some of them also show a variation in results. This can be attributed to spill-over effects (Shabani and Safaie 2018). Spill-over effects for transport infrastructure are defined as the economic impact of investments made in each province themselves but also from that of neighbouring provinces (Yu et al. 2013). Transport infrastructure can have positive effects on neighbouring provinces by allowing rapidly developing regions to stimulate less developed adjacent regions through the development of diffusion effects. In terms of negative effects, improved transportation infrastructure may incentivise the migration of workers from less developed areas to high-growth areas via agglomeration effects, causing brain drain and shrinking human capital in remote areas. These variations emphasise that the impact of transportation infrastructure is often complex and should be viewed contextually and from a holistic angle.

[16] An economy is doubly landlocked if it is completely surrounded by other landlocked economies.

Shivta led to the development of paved roads, caravanserais, fortresses and sophisticated irrigation systems, among other things.

Road networks

Road networks are an important factor for the prosperity and development of economies by allowing for the efficient mobility of labour and capital goods. They also provide various advantages for regional development: increased road density is associated with subsequently increased levels of regional employment and additional highway miles have been found to increase productivity (Carlino and Mills 1987; Carlino and Voith 1992). Road connectivity is particularly crucial for remote and isolated communities as it can bolster development by providing access to markets, job opportunities, and services. Compared to rail transport, road transport has several advantages including flexibility, convenience, and may be quicker for short distance transport of goods and passengers. Roads are also complementary to railway infrastructure: railway stations require a network of roads for them to be properly served.

Some of the oldest road networks were built by the ancient Romans around the 2nd century, which became crucial routes through which goods were transported. At approximately 85,000 kilometres long, they connected Rome with its remotest frontiers, with 29 major highways linking Rome with remote outposts in North and Central Europe, North Africa, and the Middle East (Berechman 2003). In addition to facilitating governance, Rome's road networks provided significant economic benefits by allowing commodities to be transported between its capital and provinces. Remote areas benefitted by being a part of this transportation network. For instance, a good number of the road construction workforce were hired locally, allowing for road constructions to benefit local economies. Additionally, roads were the primary way in which interregional trade was facilitated, allowing for regular transport of goods and people. Road transport was so sophisticated that it was divided in two categories: express, *cursus rapidi*, and freight, *agnarie*. Among the goods shipped from the hinterlands to Rome were gold, bushels of wheat, wine, oil, and fruit (Berechman 2003).

A more recent example of a road network is the interstate highway system in the United States. Many studies reveal positive benefits of increasing highway investments on output growth even in rural or remote areas (Aschauer 1989; Holtz-Eakin and Schwartz 1995; Munnel 1990; Rubin 1991; Morrison and Schwartz 1996). However, the economic impact of highway systems often depends on a variety of factors. For instance, the impact may vary according to industry and whether or not highways run directly through or adjacent to a given county. This variation is likely due to spill-over effects—some industries grow due to decreased transportation costs and others shrink because of the relocation of economic activity. According to Chandra and Thompson (2000), counties with new interstate highways running through them had a positive increase in earning rates by approximately 6-8% and services and retail industries grew by 5-8%. Counties adjacent to new interstate highways, on the other hand, had total earnings fall by 1-3% and retail earnings fall by 8-11%.

Studies have also been conducted on more remote highway networks in the United States such as the Appalachian Development Highway, which was initiated in 1965 and runs along the mountainous eastern region of the United States. The highway connects 26 local

and regional routes and is considered a local highway network compared to the federal interstate highway system. Appalachia, a historically isolated region, has faced significant economic challenges over the years. Hicks (2014) examines the impact of one of the highway's 26 corridors, Corridor G, which is located in the northern parts of West Virginia and Kentucky, on the economic growth of surrounding counties. The areas around Corridor G have faced challenges of a declining coal industry and rapid depopulation. From 1984 to the mid 1990's, a drop in coal prices significantly impacted the region and, in 2010, population plummeted to 50% of 1950 levels (Burton, et al. 2000). However, after the construction of Corridor G, remote counties along the highway experienced significant positive benefits. Local businesses in rural areas with more than one employee saw a positive and statistically significant increase in productivity. This was particularly the case for industries where transportation and time costs were a factor for either consumers or producers (Hicks 2014).

Local road networks have also proven to be important for the expansion and urbanisation of newly developing areas. Although the majority of oases along the ancient Silk Road have perished, the construction of modern-day roads have been key to the survival of Jiuquan City in Gansu Province, China, which is located along the remote He-Xi Corridor. The city is not only a famous tourist destination but also an important agricultural-industrial city and transportation centre. Over the past 30 years, the total industrial output has doubled and the population has increased from 40,804 in 1980 to over 200,000 in 2012. Xie, et al. (2016) argue that the construction of vehicular roads has been crucial to the urban expansion and prosperity of the city. Vehicular roads have helped increase convenience of land access and the exchange of materials. In Jiuquan, areas closer to roads urbanised faster than those further away, which is similar to the development narratives of the previously remote cities of Phoenix and Las Vegas in the United States (Wu et al. 2011; Tian and Wu 2015) and Jeddah, Saudi Arabia (Aljoufie et al. 2013).

Railway networks

Railway networks have played a pivotal role in the development of economies. Railway networks facilitate urbanisation, bring distant towns closer to cities, and aid the development of new cities alongside its tracks. In the mid-20th century, the development of road infrastructure and the popularity of automobiles and air travel have diminished dependence on railway systems. However, in recent times due to higher costs of oil, concerns about the carbon footprint of automobiles and demand for added convenience, there has been a revival in railways in Western Europe, Asia, and Latin America. Additionally, due to technological advances and added efficiency, railways in economies such as Japan and parts of Western Europe are currently viewed as convenient and affordable alternatives to air travel, with the added benefit of having lower carbon emissions (Judt 2011).

An economy that has benefitted from railway development since the 19th century is China. Two railways in Henan Province, China—the Pinghan Railway and the Longhai Railway—have contributed to the development of both urban and rural areas (Shuang 2016). The Pinghan Railway, which began running in 1910, connects China's major cities together. Its contributions include increases in population density and development of supply chains in areas along the railway, which has allowed for various cities to develop alongside its network. For instance, the Pinghan Railway's development through

Zhengzhou allowed it to rise in importance and it is today the capital of Henan Province. The Longhai Railway, on the other hand, which began running in the 1930's, connects to China's hinterlands, promoting regional market integration and welfare. This shows that for rural and remote areas, railway construction may be critical in regards to market integration and positively contribute to increased living standards for local communities.

The Qingzang Railway, a more recent development, has also contributed to the economic integration of remote areas in China. The high-altitude railway crosses the Qinghai-Tibet Plateau in China, running from Xining, the capital of Qinghai province, to Lhasa in Tibet. It also connects trains from major cities including Beijing, Shanghai, Guangzhou, Lanzhou, and Chongqing with Tibet. Wang and Wu (2015) find that Qinghai's and Tibet's per capita GDP grew as a result of the railway construction. Additionally, the Qingzang Railway has positive spill-over effects on the local economy and is estimated to have increased the annual GDP per capita of counties located alongside the railway by 33%.

Another study conducted in Iran affirms the positive influence of railway infrastructure on rural or remote development (Shabani and Safaie 2018). A number of provinces in Iran suffer from limited transportation infrastructure and low economic development. The study finds that both road and railway transportation infrastructure have a positive and significant impact on economic growth within and around a region. However, the positive impacts of railway infrastructure are found to be greater than roads. The maintenance and construction of railways are also contributing not only to local economic growth but also to economic growth in other regions. According to a study by Shabini et al. (2016), investments should especially be directed to the development of cross-regional networks to maximise economic growth impacts.

Railway infrastructure can also enhance opportunities for transportation-dependent industries such as tourism. In the case of Banff National Park in Alberta, Canada, construction of railways in the 1800's helped facilitate the development of the tourism industry around natural hot springs. During this time an entire industry called "railway tourism" was created where wealthy European and American travellers reached destinations including Banff National Park via rail. With additional infrastructure development such as highways and air transportation networks in the 1960s, and the development of four-season tourism, Banff National Park was able to attract a large influx of travellers. In fact, the number of visitors increased from under 500,000 in 1950 to more than 3.5 million in the early 1980s (Draper 2000). Today, the park is considered the "crown jewel" of the Canadian National Parks system and was awarded UNESCO World Heritage Site status in 1984. Although rail development allowed Banff to capitalise on and initiate remote tourism, additional infrastructural developments were critical to its current success.

Box 3. From Connected to Remote: the Case of Hucal District, Argentina

Argentina was the first economy in Latin American to construct a railway network, and by the beginning of the 20th century it had the seventh largest in the world (Monk 2013). Subsequently, between 1880 and 1910 Argentina become the most advanced economy in South America (Luna 2000). In 1907, the government instituted the *Ferrocarriles de Fomento*, or railroads of development to promote growth in remote areas. By the 1930s, nearly 13,500 kilometres of tracks were added to the network. This railway expansion caused an increase in population density including in rural and remote areas.

Furthermore, it bolstered economic growth by improving connectivity between rural and urban areas.

However, during the second half of the century the railway network disappeared and along with it Argentina's prosperity. This was largely due to lack of infrastructure investment and construction of major highways. In 1946, President Juan Domingo Péron announced the decision to nationalise all railroads, which ultimately led to substantial deficit. By 1960, even after privatisation of the railways, poor maintenance of tracks and ageing equipment caused annual losses from railroads to contribute to approximately 80% of the annual federal deficit. This ultimately caused the gradual dismantling and privatisation of railways in Argentina over three decades.

Simultaneously, in the 1960s, the rapid growth of the automobile industry led to major roads to be constructed. However, considering the fact that 70% of population centres in Argentina, excluding major cities, have fewer than 2,000 inhabitants, many rural areas that no longer have railway access also do not have access to major roadways. This has caused many ghost towns to emerge due to progressive migration out of towns and loss of an economic base. According to Muller (2007), rural and remote areas likely suffered the greatest losses from the decline of railway services as they are more likely to be wholly dependent on the railway.

An example of towns that declined substantially due to the loss of the railway system are Hucal and Bernasconi, located in the Hucal District of La Pampa. This district, which used to be a remote area, became populated by European immigrants after the development of railways. Access to railways allowed for agricultural goods to be transported more easily to cities. Both towns were brimming with economic activity during the "belle époque" of railway in Argentina. This shifted dramatically after the decline of the railway system. According to the national census, in 2001, 7,838 inhabitants were located in the Hucal District, which decreased to 7,400 in 2010. In 2013, there were only 20 inhabitants left in Hucal (Instituto Nacional de Estadistica y Censos 2001; Instituto Nacional de Estadistica y Censos 2010). Interviews with La Pampa farmers confirmed that a core issue is that rail services stopped before paved roads are available. Many rural roads are gravel or dirt, leading to slow and unpredictable travel. As a result, freight transport via roads cost three times as much as by train. This has negatively impacted agricultural productivity—farmers' profits plummeted as the price of agricultural products cannot keep pace with increasing freight charges (Monk 2013).

The decline of Argentina's railways is a reminder that roads and railways are not perfect substitutes. Many factors need to come into play when considering infrastructure investment especially to poorly served remote areas. Policymaking and comprehensive strategies around transportation infrastructure, particularly around rural and remote areas, need to be aligned in the long term for the benefits to be sustained over time.

V. ADDRESSING REMOTE AREA CHALLENGES

While remote areas face considerable challenges that prevent them from developing and integrating into the wider economy, there are options available to address these challenges.

Some APEC economies have enacted legislation focusing on the development and integration of remote areas, while others integrate measures for remote areas within general strategic documents and regional or rural development programmes[17]. The government has a clear role to play in addressing these challenges[18], but given the right information and conditions the private sector can also contribute to and be a partner in remote area development.

Develop infrastructure

One of the most important measures to improve connectivity in remote regions is to improve open-access infrastructure, including transport and digital infrastructure. Improved transport and digital infrastructure will connect remote communities to economic networks and open new opportunities. As the lack of connectivity is a key concept in the working definition of remoteness and remote areas, it follows that strengthening connectivity through quality infrastructure is essential to developing and integrating remote areas. Developing quality infrastructure is needed as it promotes job creation in the locality, encourages technology transfer, addresses social and environmental concerns, seeks alignment with local development strategies, and ensures financial sustainability.

A well-connected and integrated transportation network reduces the cost of logistics and travel, attracts businesses, and on the whole provides room for economic development. An example of improving transport connectivity is the rural roads development programme of India. According to the Asian Development Bank (ADB) (2012), three-fifths of the Indian population lives in rural regions, many of them in remote areas. As part of the development initiative, the Indian government built 109,000 kilometres of rural roads, which connect about 40,000 communities to major transport networks. Several other rural road development projects financed by ADB and the World Bank are in progress. The World Bank[19] noted an increase of 23% in the share of rural population having access to an all-season road since the start of its projects. Additionally, the ADB recorded an 8% increase in children enrolled in primary schools in the state of Chhattisgarh, compared to pre-project levels.

The Western Australia government, in 2013, developed a regional freight transport network plan spanning until 2031. The plan covers road, rail and port development in Western Australia's regions and expects a 200-250% increase in road, rail and port freight movements by 2031. This development plan is being driven by increasing demands for freight from Western Australia's growing economy, mineral resource industries, and relatively large industrial-zoned land. As a result of these development initiatives, exports

[17] Based on responses to the APEC Questionnaire on Remote Areas Development and Integration, all 14 responding APEC economies reported that economy-level policy is applied to address the problems of remote areas, and special programmes for these areas are being implemented in the economy. Moreover, seven of the respondents indicated that remote areas have some special status in their economy (see Annex A).
[18] APEC economies which provided responses to Questionnaire on Remote Areas Development and Integration indicated that special funds for remote areas development are being provided by the government.
[19] World Bank. *PMGSY Rural Roads Project.* Retrieved from World Bank: http://projects.worldbank.org/P124639/pmgsy-rural-roads-project?lang=enandtab=results

and imports through ports are expected to increase by 140% and 98%, respectively, while net freight transported by rail is set to increase by 126% and by road by 93%, by 2030.[20]

ICT infrastructure development is also vital in connecting remote areas to the wider economy, especially as new technologies can help these areas transcend barriers of geographic isolation and distance. The UNESCAP's Asia-Pacific Information Superhighway aims to expand broadband access, including those in rural and remote areas, in order to widen economic opportunities for all people.[21] Lithuania has shown successes in expanding its fibre-optic network to remote communities. Its initiative involved laying down 485 kilometres of cables and establishing an additional 426 broadband internet access points reaching out to rural farms and tourism centres. As a result, 100,000 rural residents have gained access to high speed broadband and access to internet, representing a 12-fold increase in rural access to the internet between 2005 and 2015[22].

Connecting remote regions with ICT is of particular importance to a large economy like Russia whose population density can be as low as three inhabitants per square kilometre. As a result, the Russian government has ramped up efforts in the last two decades to improve access to broadband connections and increase the number of internet users. The economy currently boasts an ambitious plan to improve remote region connectivity. Some of the initiatives include plans to provide settlements (with populations of 250-500 people) with broadband connections having data transfer rates of at least 10 megabytes per second and to construct 200,000 kilometres of fibre optic communication lines before 2019 (Rossotto et al. 2015).

At times, however, building physical infrastructure can be constrained by factors like difficult terrain and extreme climate conditions. In cases like these, innovative solutions may be needed in the context of remote area development. For instance, cable cranes can be used to transport workers and equipment to plants or construction sites that are located in difficult-to-access sites (Vogelmann 2017).

Utilise and mobilise ICT

Information and communication technology (ICT), if sufficient infrastructure is in place and free flow of information is ensured, can be mobilised to bring services to remote areas while avoiding the high costs related with traditional service delivery modalities. While the delivery of basic services such as education and health still requires the availability of primary service infrastructures (e.g., primary schools, health referral services), ICT can be used to enhance the quality of these services and expand the reach of tertiary-level services available in population centres.

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[20] Department of Transport. (n.d.). Western Australian Regional Freight Transport Network Plan. The Government of Western Australia. Retrieved from https://www.transport.wa.gov.au/mediaFiles/about-us/ABOUT_P_RegionalFreightPlan_FullA3.pdf

[21] UNESCAP, Asia-Pacific Information Superhighway, https://unescap.org/our-work/ict-disaster-risk-reduction/asia-pacific-information-superhighway

[22] EAFRD. (n.d.). PRIP: Development of broadband connection infrastructure in rural areas. Brussels: European Network for Rural Development. Retrieved from https://enrd.ec.europa.eu/file/9788/download_en?token=_8BaJDiC

A. Education

The availability of ICT has changed the way in which knowledge is disseminated, not only in remote areas but also everywhere else. ICT has made it possible to transfer knowledge from someone who is not present at the same location by making it available on the internet. Furthermore, the costs of acquiring this knowledge are relatively low, namely the cost of getting access to the internet and a fee that may or may not be required for the purchase of the knowledge (e.g., e-books, subscription to journals, etc.).

Online access to journal articles, e-books and online lectures has become more common in recent years as the convenience of their access has increased demand. A market research conducted by Stratistics MRC found that the global e-learning market amounted for USD 165.21 billion in 2015 and is expected to grow at a compounded annual rate of 7.5% (Reuters 2017). The study lists opportunities for flexible learning, accessible low-cost resources, and higher effectiveness through animated learning as the factors that drive this market's growth.

To improve education in remote areas, ICT can be used to catch online content for offline consumption and to facilitate learning with mobile phones. UNICEF Uganda's MobiStation is a notable example of capturing online content for offline use. The MobiStation is a solar-powered multimedia kit that fits a laptop, projector, and speakers into a suitcase. It is used in remote schools and health centres to provide access to learning materials by projecting informative materials like school books and teaching videos. It eliminates the need for internet access and provides an interactive learning environment in Uganda which is plagued by teacher absenteeism, lack of books, and poor infrastructure (UNICEF 2014).

Mobile phones may also be used as an alternative to promote exchange of information in places that lack internet connections. A study conducted in Papua New Guinea analysed the impact of sending text message stories and daily lesson plans using short message service (SMS) on the reading ability of children. The design of the "SMS Story" initiative was to introduce reading English to students, and it resulted in a 50% increase in children's ability to read compared to the control schools. In this programme, however, teachers were not properly trained and limited the initiative's impact (Trucano 2014), showing that ICT should be seen as a complement to, and not substitute for, primary school teachers.

ICT also provides resources to improve rural teachers' professional development. According to Robinson (2008), this is possible by providing life-long learning opportunities and professional support to educators. Teachers in remote areas can use mobile phones to improve access to educational materials, as was the case in Tanzania where teachers could request and receive video content via their 2.5G/3G networks to display on screens in the classrooms. According to Trucano (2009), 150 schools in Tanzania and 290 schools in the Philippines use this system. In Afghanistan, SMS is used to reinforce lessons learnt in trainings and encourage adoption of new skills and completion of follow-up action plans for healthcare providers in limited resource settings (Bontempo 2010). A similar system can also be applied to the teaching field, enabling access to new information and guidance via SMS for educators. Hence, measures can be taken in economies to adopt, expand or alter these technologies and initiatives to the local environments to improve both teaching and learning in remote regions.

B. Health

There are similar success stories of applying ICT to health services in remote areas. While self-learning with digital materials is common due to the flexibility and ease it provides, self-treatment may not attract the same amount of enthusiasm. Nevertheless, transfer of health data and access to medical advice can be improved in remote regions with the use of ICT. As ownership of communication devices like mobile phones, computers, and smart watches has grown, so has the use of mobile health (m-health) applications. According to GSM Association reports, 85% of the global population is covered by wireless signals, extending further than the electrical grid. Thus, a significant portion of people can have access to m-health services provided by their devices.

Healthcare providers can use ICT to cater to remote regions through m-health applications. M-health enables tracking of vitals, delivery of data to healthcare providers, provision of care through medical advice, and dispersion of information. Oyaro (2016) notes the adoption of m-health in Malawi where a mobile phone transforms into a virtual clinic. He finds that patients are able to provide and receive all the required information without travelling to health centres. Additionally, text messages are used to provide reminders for taking medication and tips on better care. The service has been of particular importance for pregnant women who might not have access to pre-natal and post-natal advice without it. Moreover, the mobile phone company provides the service on a toll-free number, further reducing the barriers associated with cost. Along with the support of the Malawi government, the service caters to over 500,000 mothers and children.

Another example comes from the remote regions of New South Wales, Australia, where a mental health project has been established to provide 24/7 support through video conference, giving patients access to immediate medical attention[23]. Furthermore, to ensure the best possible care, efficient recording of current and past health data can be done with the use of ICT. The eHealth record system, developed by the Australian government, enables centralisation of information, allowing access to both healthcare providers and patients and leading to improved efficiency and better patient care regardless of location.

Similar to education, ICT can also be useful in retaining and providing professional support to medical workers in remote regions. A study by Bagayoko et al. (2014) evaluated the impact of distance learning with the use of ICT on healthcare professionals in Mali. Eighty-five per cent of surveyed healthcare professionals found their operations to be more effective and 65% noted better relationships with patients as a result. The networking opportunities provided to them also addressed professional isolation. Overall, the findings of the study indicated ICT as a useful tool in recruiting and retaining healthcare professionals in remote regions.

Box 4. Utilising ICT for Poverty Alleviation in Remote Areas

Although poverty is not unique to remote areas, the challenges faced by remote areas exacerbate the impacts of poverty. The logistical difficulties and high costs of delivering basic services such as education and healthcare in remote areas make it more difficult for poor people to develop their skills and capabilities. High costs, lack of competition,

[23] CeBIT Australia. (n.d.). How technology is improving health in remote areas. Retrieved from CeBIT Australia: http://blog.cebit.com.au/how-technology-is-improving-health-in-remote-areas.

and a large informal economy limit the poor's economic opportunities and choices in remote areas. Furthermore, environmental and economic vulnerability affects poor households more acutely as they are less able to recover from negative shocks.

Digital technologies and ICT can contribute to poverty alleviation in remote areas by reducing the costs of delivering basic services and enabling the poor to take advantage of opportunities in the internet and digital economy. Improving the access to digital services and universal broadband access in rural and remote areas can contribute to bridging the digital divide. On the other hand, reducing structural barriers to participating in e-commerce, building online platforms, and integrating into e-commerce systems can promote entrepreneurial activity in remote areas.

Online support through the use of ICT can also contribute to improving the quality of education and healthcare in remote areas. For example, ICT can complement basic education facilities in remote areas by allowing specialists in urban areas to conduct lectures with students in remote areas. Physicians and healthcare workers in remote areas can consult with and refer patients to specialists in urban areas through digital platforms. Moreover, teachers and doctors in remote areas can pursue professional education and skills upgrading through online learning modules with, and developed by, universities and specialised training institutes that are often found in urban areas. This, in turn, can contribute to improved delivery of education and healthcare services to poor people in remote areas.

ICT and the internet and digital economy can also open new avenues for social assistance, philanthropy, and charity. Platforms for e-commerce and fintech could be used for delivering social protection, contributions to charitable causes, crowdfunding for poverty alleviation projects, and contributions for disaster relief. Likewise, platforms for the sharing economy could contribute to reducing the costs of delivering services to poor households.

Finally, ICT and digital platforms can facilitate data gathering on household consumption and expenditure in remote areas, providing the needed data to enhance governance and improve service delivery and targeting. The use of e-surveys, smart point-of-sales systems, and financial access tools can not only provide firms with relevant market data but also assist policymaking for poverty alleviation in remote areas.

Improve financial inclusion

Lack of access to financial services poses a challenge to remote communities. According to Narain (2009), there are demand- and supply-side issues that prevent improvement in access to finance. The lack of knowledge about financial products and services, and low income leading to poor repayment capacity and lack of collateral present demand-side issues. On the supply side, constraints include high cost of serving a small population in regions with poor infrastructure and communication networks. As a result, a large portion of rural and remote communities lack access to financial institutions.

A. Addressing demand-side issues

Several initiatives have been implemented to address demand-side constraints, one of the prominent ones being the Grameen Bank of Bangladesh. It was established to provide credit access to rural communities by eliminating the need for collateral and establishing a system based on community trust, hence tackling one aspect of the demand side issue. According to the Grameen Bank website, as of December 2017 there were 8.93 million borrowers of which 97% were women. Its 2,568 branches boast a 97% coverage of all villages in Bangladesh. As of June 2018, it has disbursed USD 25.1 billion worth of loans since inception and a recovery rate of 99.1%.[24]

With regard to the lack of financial literacy, Fuchs (2017) notes Laos' efforts in financial education and training at the rural level. The Laos government along with the central bank are working on establishing a financial literacy strategy while at the provincial level, seven microfinance institutions are providing regular technical assistance and on-the-job training to support the village-level bank network. Additionally, the project provides targeted financial literacy courses, within which 17,000 people in targeted villages and 17 vocational teachers have received training. ADB has also experimented with using mass media—i.e., a soap opera—to promote financial literacy among the poor in Mongolia and complement literacy efforts by facilitating mobile-based financial services.[25]

B. Addressing supply-side issues

ICT-related solutions have been utilised to address supply-side barriers to finance. An example is mobile banking, which enables people to meet their financial needs irrespective of the location of the nearest bank branch. Kenya's mobile phone operator, Safaricom, introduced M-Pesa, a service that allows money transfers between mobile phones by SMS (Ondiege 2013). This service was designed to provide financial services to remote populations using even the most basic of mobile phones: the service was used by 10 million people as of 2009, and the number of clients grew by 61% in 2010, a third of whom were clients who were previously unbanked. The service has also been effective at keeping costs low at USD 0.46 per transaction. Another Kenyan initiative, M-Kesho, developed through a partnership between Safaricom and Equity Bank, links bank accounts to M-Pesa accounts, enabling transfers between accounts and encouraging savings (Ondiege 2013). Between 2007 and 2012, the bank's deposit base grew at an average compound growth rate of 40%. Both these initiatives became popular because they did not require bank account opening fees, minimum balances, or monthly charges. Ondiege asserted that M-Pesa and M-Kesho will drive the banking sector in Kenya, as M-Peso increases access to financial services and M-Kesho turns the access into deposits.

Likewise, a South African initiative by a mobile phone company, MTN, provides clients access to their accounts from anywhere in the world using a secure connection through their MTN mobile phone. In 2010, MTN announced its aim to provide full-fledged bank accounts on their mobile phones with optional credit cards and to extend the service to the 20 economies in which MTN operates (Ondiege 2013).

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[24] Grameen Bank Monthly Report 2018-06, http://grameen.com/monthly-report-2018-06-issue-462-in-usd/
[25] ADB, Mongolia: Promoting Inclusive Financial Services for the Poor (Project 44112-012), https://www.adb.org/projects/44112-012/main

In 2012, the International Finance Corporation (IFC) along with the Bank South Pacific (BSP) connected millions of remote inhabitants in Papua New Guinea to financial services (IFC 2016). With the assistance of its subsidiary, BSP Rural, BSP sent its workers to remote villages with tablets and mobile computers to open accounts and issue bank cards. BSP's innovative banking model enabled clients to access their funds, make transfers, and check balances with their mobile phones. About half a million unbanked Papua New Guineans were given access to financial services, making USD 175 million worth of transactions through cash deposits, transfers, remittances and payments with their mobile phones by 2015 (IFC 2016). These examples acknowledge the successful use of mobile banking in some remote regions and provide ideas for their implementation in other isolated areas as well.

Manage sustainability of natural resources

Experience shows that it is necessary to improve access to and sustainable management of the natural resources to provide ample opportunities for the local economy and to benefit the poor (Lee and Neves 2009). Unsustainable management of resources can undermine the long-term benefits to be gained from resource extraction.

A. Economic Sustainability

Economic sustainability is related with diversification. A key risk to communities reliant on a single industry is that they are vulnerable to economic shocks related to that industry. These shocks can come in the form of supply-side shocks (e.g., depletion of the resource or disruption in its production) or market shocks (e.g., fall in prices or lack of demand).

According to Husselman (2008), Zambia's bee-keeping policy provides opportunities for the development of supportive industries and the seasonal nature of agriculture offers room for alternative employment in the form of bee-keeping for rural households. The latter allows diversification of the local economy and prevents over-dependence on a single economic sector. Freudenburg (1992) asserts that the key characteristics of rising costs of extraction especially in remote areas, combined with falling global commodity prices do not provide stability for single-industry communities. While Freudenburg recommends development of diversified employment, he also recognises the challenges in heeding this advice since the lack of connectivity, small populations, and lack of skills in remote regions present a difficult environment for industry development.

Fafchamps et al. (2017) find that liberalisation of gold mining in Southwestern Ghana led to rapid production and urbanisation of the location. The presence of gold mines caused agglomeration effects leading to the clustering of non-farm employment opportunities in the vicinity. They also find no reversal of changes upon closure or shrinkage of the mines, instead the share of formal sector employment and manufacturing and trade-related employment increased. The same is true of gold mining in Johannesburg wherein a tight link between mining and tertiary services enabled development of the region as a finance hub (Harrison and Zack 2012). Johannesburg owes its origins to mining but can hardly be identified by that sector anymore. The mining industry in Johannesburg has faded but the city continues to grow on the diversified economic activities, which were first established to support mining.

B. Ecological sustainability

Ghosts of past mining practices and other extractive activities are reappearing in the form of environmental damage. Despite the closure of mines in Johannesburg, acid mine drainage poses a grave danger for the neighbouring communities (Harrison and Zack 2012). Environmental concerns regarding the development of an all-weather road to Izok Lake are also being voiced since the project may accelerate disorganised mineral development in the region.

In addition to policies and regulatory measures that mandate environmentally sustainable resource extraction, technology and innovation are needed to ensure sustainable extraction and use of resources. Plaizier et al. (2016) discuss the opportunities for sustainable mining through adoption of new technologies that reduce energy intensity and improve water and air cleaning systems, among others. Batterham (2014) notes the use of a laminated geosynthetic clay liners to prevent contamination of the surrounding ground at the Monsanto Blackfoot Bridge Mine in Idaho. He also acknowledges the practical use of bio-treatment of contaminated water in these areas, especially since mining requires heavy use of water. Furthermore, Maponga and Ngorima (2003) explain the attempts at overcoming environmental issues in gold panning regions of Zimbabwe. The wooden dishes used for panning cause vegetative destruction in acquiring the wood, hence, metal dishes made of scrap metals are being promoted. Another innovation relates to the use of win-sifting gravity gold separator which eliminates the use of water for recovery. Zambian bee-keepers have in recent years adopted technologies that will make their production more efficient and competitive. Husselman (2008) notes the promotion of wooden Kenyan top bar hives, which are easier to manage, produce better quality honey and have greater yields.

Education and training of workers is another measure that can improve environmental awareness and facilitate sustainable resource extraction. According to Amankwah and Anim-Sackey (2003), the Minerals Commission of Ghana developed programmes to educate workers on safe mining and environmental issues as an attempt at improving sustainable development. The authors recognise the limited funding available and encourage putting aside a budget for educational programmes as part of the policy framework. On the other hand, the legalisation of gold panning in Zimbabwe has enabled more cooperation between mining companies and panners (Maponga and Ngorima 2003). These companies are now funding education programmes to teach better resource recovery methods and environmental management of the mines. Continuous education programmes are recommended to better disseminate information on new technologies and measures for environmental sustainability and the long-term benefits that follow.

Attract investments

Foreign direct investments (FDIs) into remote areas provide an opportunity for regional development through improvements in technology, skills, knowledge and competitiveness. Local firms can take advantage of the technology and management skills brought in by foreign companies (Copenhagen Economics 2006). Government investments into remote regions will also complement the flow of FDIs. As FDI brings in more money and business to the remote region, local governments may want to invest in developmental projects like improving infrastructure and human capital development to retain the foreign businesses and improve local productivity.

One way to attract FDIs into remote areas is to develop SEZs that provide incentives for foreign firms to locate there. Studies have recognised SEZs as a successful strategy for enhancing economic growth by stimulating the local economy and raising employment levels (Pakdeenurit, et al. 2014). Particularly for developing economies, SEZs help economies overcome barriers that hinder economic growth such as poor infrastructure, weak governance, and restrictive policies (World Bank 2012; World Bank 2017). On a more regional level, SEZs and FDI have been shown to provide benefits to local areas in the form of employment, tax revenue, and increased foreign exchange earnings. Technology and knowledge spill-overs—particularly in production management, organisational management, and product quality—can improve productivity among local producers. (World Bank 2008).

According to Tao et al. (2016), the Chinese government has proven to be particularly successful in its 35 years of developing SEZs. It began in 1980, when the Chinese government authorised four SEZs to develop remote regions and reduce poverty. One of the four SEZs was the Shenzhen SEZ which was located in Guangdong, estimated to house a population of 30,000 in 1980. The zone aimed to attract FDIs through the provision of tax incentives and preferential treatment for investment, among others. The result was an increase in Shenzhen's population to 12 million, 4,315% increase in GDP per capita, and a 5,942% increase in employment by 2014 (Tao et al. 2016). SEZs provide a conducive investment environment through specialised structural reforms (including improved regulatory practices), improved infrastructure, and access to financial incentives.

The SEZ development, however, does not occur in a vacuum. As mentioned by World Bank (2017), there are many factors to consider before converting a remote area into an SEZ, and a well-designed and rigorous feasibility study will be needed to find suitable investment sites. Structural reforms are also often needed to develop an enabling environment that will attract investments, along with infrastructure development—within and outside the SEZ—that will contribute to improvements in connectivity and logistics. Pakdeenurit et al. (2014) list some key criteria to consider when establishing an SEZ: political stability, government policies and laws/regulations, macroeconomic profile, investment costs, strategic location, and access to skilled labour. Hence, although conducive policies and regulations are critical factors, location remains important. Economies looking to develop SEZs in remote areas may need to consider whether there are any strategic advantages to the area (e.g. access to trade corridors or the sea). Otherwise, the government may need to invest significantly to develop infrastructure outside the SEZ and develop special incentives to offset additional costs (Mukherjee, et al. 2016). Lack of adequate skilled labour is another significant concern as remote areas often experience brain drain. Professionals may be hesitant to relocate to isolated and undeveloped regions that lack sufficient social infrastructure including schools and hospitals (Mukherjee et al. 2016).

Besides creating SEZs, governments may also make direct investments into developing their remote regions to attract businesses. Many economies have done so with funds from development banks and international organisations. The Papua New Guinean government along with the World Bank have initiated a rural services improvement project that provides development grants for investments in rural areas, covering over 200,000 people. The funds will support improvements to transportation infrastructure, sanitation systems, and service centres like schools and health clinics (World Bank 2017). Mbi et al. (2014) notes the African Development Bank's support in providing electricity connections to 25

of Morocco's most remote districts, covering 86,000 households. The project involves investment in renewable energy, i.e., wind and hydropower, to provide a sustainable and cost-friendly option for electricity for the local communities. It is expected to create 42,000 temporary construction jobs and 700 permanent maintenance jobs in the wind farms. Improving local infrastructure and services will attract people, skills, and businesses into remote areas, encouraging development.

Improve governance

Governance of remote areas is often left to local governments due to their ability to be more sensitive to factors unique to the remote communities. This practice reflects the principle of subsidiarity, which asserts that efficient service provision requires decision making at the level of governance closest to the individual (Slack 2003). However, the lack of economies of scale, small populations, and isolation impose challenges for remote area governance. Small tax bases and high costs of living in remote areas further strain local government funds. Considering the advantages of localised governance along with the stated challenges, Slack notes the option of attaining assistance grants from higher levels of government so that local governments or municipalities can organise, fund, and deliver the local services themselves. However, she acknowledges the need to consider efficiency in deciding the allocation of funds so as not to fund communities that would not survive in the absence of such assistance.

Slack (2003) further suggests that remote regions that do not have municipal organisations can be assisted through the development of Local Services Boards (LSB) or Area Service Boards (ASB), which would be funded by the provincial governments, service fees, and the Boards' funds. There are LSBs in unincorporated remote communities[26] of Northern Ontario, Canada, where the Board is responsible for the supply of water, sewage, roads and fire protection amongst others. The main advantage of similar special purpose boards is to be able to share the costs of services and generate scale economies. In the case of an ASB, costs are shared among the municipalities and the unincorporated regions in the board's area and for LSBs, they are shared among the residents of the unincorporated regions. As a result of the cost sharing, economies of scale may be achieved.

Even though the subsidiarity principle professes low central government involvement in the management of remote regions, there are benefits in the central government being able to overlook the management to ensure alignment of goals and to attain information for broader policy making. ICT has proven to be useful in providing a means for all levels of government to attain information and monitor remote regions through the use of remote sensing. Remote sensing technologies like cameras, satellites, and lasers are used to attain information without having to be actually present at the location (National Research Council 2003). It not only enables central governments to oversee remote regions but also facilitates the work of provincial and local governments to manage isolated and unconnected regions in their jurisdiction. For example, remote sensing was used to test the surveillance of Pitcairn Island's marine reserves, which encompass 99% of the island's Exclusive Economic Zone, during a trial lasting 13 months (The Pew Trusts 2016). The remote sensing technologies were used to enforce seafloor mining and commercial fishing-related prohibitions. The technologies now stand as a standard for remote marine area

[26] Unincorporated areas are areas that are not under the jurisdiction of an incorporated municipality, town, or city. Unincorporated communities are unincorporated areas that are populated.

surveillance since the trial revealed high levels of compliance and has proven to be effective as a long-term surveillance programme.

Law enforcement can also be facilitated through the use of remote sensing. Kelly and Kelly (2014) note the use of remotely collected images from sensors on satellites and aerial vehicles in detecting crime at regional levels. Most of the existing literature discuss the use of remote sensing technologies in urban locations, but their application in remote areas can be made possible if investments in mounted sensors and cameras are made. It is also necessary to recognise the drawbacks in using remote sensing technologies to detect crime, such as the ability to only detect large scale crimes like logging and drug production and not small-scale, street-level criminal activity. This is because small-scale crimes may not be visible from above and for a sufficient amount of time for them to be detected. Also, remote sensing fails to record the social, economic and political context of the environment of the crime or the actions that occur within them to provide a fuller picture. Validation can also be a concern for remote sensing of crime, hence making it imperative to ensure an accurate analysis of the images before acting. There are, however, several examples that note the use of remote sensing, for instance, Google Earth has been used to detect drug production in Switzerland, illegal waste dumping in Bangalore, India, and illegal logging in the Philippines, among others. Moreover, the United Nations Office on Drugs and Crime's Illicit Crop Monitoring Program has been using remote sensing technologies to detect drug crop plantations since 1999 (Kelly and Kelly 2014).

Greater availability of data can also improve the central government's participation in remote region governance and facilitate the functions of local governments, especially if there are geographical challenges. Since physically conducting surveys and follow-ups in isolated regions can be expensive, technology can be used to attain reliable data at a lower cost. Data can be obtained through online surveys, data exchange networks, and similar processes. There could be issues of lack of responsiveness and understanding with online surveys, but provision of incentives and clearer instructions may improve the outcomes. An example of a data exchange network is seen through an ADB project in Nepal. ADB (2008) provided a USD 25 million grant to develop information technology services and products in remote Nepal. The project specifically aimed to establish public-private partnership arrangements to provide wireless broadband networks to 38 remote districts. It also sought to develop a government information network facilitating data exchange between governments and enabling central management of information.

Mobile government (m-government) and e-government are also gaining momentum as the number of people with access to mobile phones and internet is on the rise. Kushchu and Kuscu (2016) define m-government as the use of mobile phones and wireless technologies to improve the facilitation of government functions. They note the use of m-government in reaching citizens and exchanging information especially in remote regions since there is widespread use of mobile phones and limited telecommunication infrastructure. Overall, greater exchange of information and surveillance of remote regions will enhance regulation, support policymaking, and improve governance.

Manage and mitigate risks

As discussed under the challenges section, remote regions are vulnerable to environmental and community risks. Developing and integrating remote areas will need management and mitigation of these risks.

A. Environmental risks

Environmental risks arising from climate change are especially concerning for remote economies that are geographically isolated, dependent on one resource, or engaged in unregulated unsustainable activities. While a well-balanced policy and regulatory structure can ensure that economic activities remain sustainable, governance challenges and distance from regulatory authorities can make implementation and monitoring difficult. Mitigating environmental risk is not only the task of the government but also of the stakeholders including firms and communities.

Environmental risks can be tackled by educating remote communities of the impending threats and informing them of the right practices to conduct their activities, so that efforts can be made at the individual level. While information and education campaigns are a way to provide information on environmental risks, the other is to integrate information sharing with other activities. For example, the Rural Nurse Environmental Health Education programme was set up by the National Institute of Medicine and the American Nurses Association to increase nurses' ability to address environmental hazards and health-related risks. The aim of the project was to look into the nurses' perceptions of important environmental health topics in their specific communities, to explore possible learning methods that would increase nurses' participation in activities educating on environmental health, and to provide environmental risk reduction education. Since nurses constantly interact with people in the community, they will be able to spread knowledge on environmental hazards (Braaksma 2016). Likewise, the National Oceanic and Atmospheric Administration of the United States (NOAA 2018) noted the organisation of a Wildlife Conservation Society workshop titled "Community Oil Spill Response in Bering and Anadyr Straits" aimed at building capacity, promoting meaningful communication between the communities and implementing training plans for emergency response among community members. Overall, this will improve the ability of locals to deal with environmental risks.

Diversification can also be promoted as a sustainable form of development that lowers environmental risks, especially in resource extracting remote communities. It is common for communities to build entire livelihoods and economies on a single activity and once the resource for that activity has been exploited, the community disappears. A result of this is not just another ghost town but also continued worsening of the landscape and high risk of environmental dangers due to the unsustainable activities conducted (Harrison and Zack 2012; White 2013). Diversification provides a chance not only for other services to flourish but also gives the locals the option of not having to depend on one resource, hence allowing space for more regulated and sustainable management of the resource. A study on mining in Ghana by the International Council on Mining and Metals (2015) acknowledged the increase in regulations in the mining sector by noting the endorsement of six mining laws and regulations in 2012 alone. It also discussed the promotion of upstream linkages to enable economic diversification and reduce reliance on the mining sector.

B. Community risks

There is a need to address community risks that arise out of differences in culture and practices. These risks are higher in remote communities since remoteness leads to social isolation that poses governance challenges (Martiniello 2017). Isolation can also induce a lack of openness leading to difficulties in assimilation and integration.

Mitigating these risks involves stakeholder engagement, communication, and providing remote communities the opportunity to contribute. For example, the Wildlife Conservation Society workshop provides a venue for meaningful community input on plans and effective communication with stakeholders (NOAA 2018). The workshop contributes to reducing community risks through advocacy and training so that Arctic policy can be socialised and native Alaskans can benefit from the developments. Likewise, the Canadian Trans Mountain expansion project has promoted communication among its stakeholders and signed Mutual Benefit Agreements with 43 aboriginal groups to share profits, hence preventing the feeling of exclusion among the locals (Trans Mountain 2018).

Providing opportunities to contribute and participate in decision-making improves relations between outsiders and the local communities as seen in the Community Forestry Research Project (CFRP) in Cambodia. The project aimed to strengthen local communities' voices and practices through training and development of links that enable stakeholders to better understand and influence policy (Kamnap and Ramony 2006). At one of the five CFRP research sites, community members in Chumkiri in the Kampot Province noted appreciation over the closer working relationships between the locals and the foresters. The Chumkiri community forestry group has since hosted 28 visits (Kamnap and Ramony 2006). Working with the foresters has enabled locals' participation in activities that impact them and their surroundings, providing them with a sense of significance and security.

Another example relates to the Peace River oil sands deal in Canada. According to Cattaneo (2013), the Peace River oil sands deal was the first oil sands deal to be built on common interests. The company and the communities in the Peace River area have agreed to a joint venture to ensure environmental sensitivity, alignment with the communities' plans, and provision of jobs to the locals. Hence, collective activities strengthen the unity of the community and become instrumental to remote area development.

Box 5. The Private Sector's Role in Connecting Remote Areas

The private sector can play a key role in developing quality infrastructure and connecting remote areas to global value chains by investing in infrastructure through public-private partnerships (PPPs) as well as by innovating to address remote area challenges.

According to Koppenjan (2008), PPPs—if implemented properly and efficiently—can be an attractive option for the construction and operation of infrastructure projects since they attract private investment, provide greater value for money due to cost-conscious and efficient practices, promote expertise and innovative solutions, and ensure good project management. One example of PPPs in remote area development is the creation of special economic zones (SEZ), which are areas that benefit from special taxation and legislation to attract foreign direct investments. Tseyenbaljir (2010) notes the increasing trend in private sector participation in SEZ development. Only 25% of SEZs were

developed and operated by the private sector in the 1980s; by the 2000s this proportion has risen to 62%. This has been beneficial in reducing public sector costs on SEZ development and in acquiring much-needed investments for basic infrastructure, especially in remote SEZ sites.

The private sector has also contributed to infrastructure needs in remote regions through innovative solutions. One of the main constraints in utilising ICT in remote areas is the lack of stable electricity supply. Measures like installing solar panels that are independent of the electrical grid have become a cheap and popular option in disconnected areas. For example, some remote areas in the Philippines have used WiLDNet, a long distance Wi-Fi network that is supported by solar panels, for internet connection (Goodier 2015). A similar technology has been used to connect remote areas in Uganda. Likewise, BRCK, a Kenyan company, saw the infrastructure limitations of rural and remote areas in Africa and developed a product that could alleviate electricity and internet constraints. Its latest product, SupaBRCK, is a solar powered, waterproof Wi-Fi box that provides 3G and off-the-grid service to about 100 users (Bright 2017).

Other economic and innovative measures to make up for the lack of infrastructure are also available, like the use of guerrilla telecommunication networks in Papua, Indonesia. According to Talbot (2013), the inhabitants of the remote highlands in the province have developed a self-managed network using cheap base stations strapped to a treetop for mobile coverage. These innovative solutions present alternatives to augment infrastructure limitations in remote areas. For stability, infrastructure and ICT need to go hand-in-hand to sustainably provide services.

These examples show that the private sector can play a key role in remote area development and integration. Investments from the private sector through foreign direct investments or PPPs can help share the costs of infrastructure development. Likewise, innovations developed by the private sector can help address connectivity constraints in remote areas while opening these markets to new products.

VI. APEC AND REMOTE AREA DEVELOPMENT

Despite the lack of direct reference to remote area development in APEC documents, there has been some work on issues of high importance to the topic. Between 2010 and 2017, 16 projects and initiatives have been undertaken on remote area development. Seven of these projects were related to energy; two each on ICT, micro, small and medium enterprises (MSMEs) and health; and one each on agriculture, transportation and emergency preparedness.[27]

The energy projects covered topics concerning development of green energy farms, photovoltaic systems, micro-grids and off-grid electrification options to improve provision of basic amenities and facilitate development of other services that are dependent on energy. The two ICT projects were only loosely based on remote regions and in general involved information and experience sharing on improving ICT implementation and connectivity. Only one project on transportation was undertaken regarding capacity

[27] Based on "Remote Areas Development in APEC Agenda" (Document No. 2017/SOM3/SCE/DIA/009).

building to improve access to remote airports. Of the two health projects dealing with health workforce management in rural areas and addressing indigenous community mental health, at least one was related to education. In addressing environmental risks, there was an emergency preparedness project that sought to improve early warning and public alert provisions. Lastly, the projects that focused on improving economic opportunities in remote regions looked into opportunities for women-led microenterprises and for MSMEs in the border areas of APEC economies.

Most of these projects and initiatives are in some way useful for remote area development but are not intended to directly address remote area challenges. Indeed, many of the priorities set out in various APEC documents are highly relevant to remote areas development, but, at the same time, they rarely contain any direct reference to remote areas. Moreover, some issues that are crucial to remote area development—e.g. structural reform, education, transportation, tourism, access to services, investment facilitation—are barely discussed in the context of remote areas. Thus, there is a need to fill this gap and highlight the importance of remote areas development in order to explore untapped economic potential in these areas.

How APEC can contribute

A broad review of literature relevant to remote area development yields two observations. First, there is not much work on remote area development. While there are many papers on remote areas and many papers on economic development, there are very few papers on stimulating economic development in remote areas. In order to do this study, a very wide net had to be cast to explore multidisciplinary literature on a number of topics ranging from tourism and resource extraction to economic history and small-island economies. Remote area development and integrations *per se* is a topic that is not so widely written about or discussed. Remote areas are often lumped with rural areas, but in doing so issues specific to remote areas are not given due attention.

Second, when remote areas are discussed, it is almost always in the context of giving some form of assistance. This assistance could be in the form of delivering a service such as electricity, education, or healthcare. Policy mentions of remote areas, on the other hand, often discuss subsidies, cross-regional transfers, or budget allocations. While delivery of assistance to remote areas is necessary, there is little systematic discussion about the economic potential of remote areas with the view of improving connectedness and making them self-reliant.

APEC can contribute to remote area development and integration by creating knowledge and initiating discussion on tapping the economic potential of remote areas. For example, APEC could look into improving connectivity through quality infrastructure investment (including energy, transport, and ICT) and public-private partnerships, pursuing structural reform to improve investment climates, integrating remote areas into global value chains, providing basic services (including education and health), and attracting foreign direct investments into remote areas where conditions are conducive. APEC could also discuss ways in which economies could promote economic exploration into remote areas; i.e., laying down business-friendly conditions, putting in environmental and social safeguards, and encouraging public and private investment in remote area development. The potential

of trade corridors, quality infrastructure, and trade facilitation to bring remote areas into local or global supply chains is another topic that APEC can consider.

APEC is well-placed to contribute to remote area development due to its diversity in terms of economic development and geography. There is a significant need for economies to share experiences and practices in developing remote areas and integrating them into the wider economy and supply chains. The review of literature shows that many economies already have significant experiences in addressing remote area challenges and developing remote areas into productive economic centres—sharing this wisdom and know-how could benefit other APEC economies as well. APEC could also look into developing diagnostic methods and toolkits to help economies identify remote areas that have significant economic potential, which can then be the focus of investment promotion. A complementary line of work could be the development of a checklist of enabling factors for remote area development and integration.

Working on remote area development and integration is in line with APEC economies' commitments to build open economies and promote balanced, inclusive, sustainable, innovative, and secure growth. APEC Leaders have endorsed initiatives which impact on remote area development, such as the APEC Connectivity Blueprint; APEC Internet and Digital Economy Roadmap; APEC Strategic Blueprint for Promoting Global Value Chains Development and Cooperation; and APEC Action Agenda on Economic, Financial, and Social Inclusion. Remote area development and integration is a cross-fora issue. Many of the topics that are relevant to remote areas are already being discussed in various APEC fora, albeit not necessarily focused on remote areas. Table 1 shows a partial mapping of issues related to remote areas and the APEC fora that discuss them.

Table 1. Mapping of remote area issues and APEC fora

Remote Area Issue	Relevant APEC Fora and Group
Connectivity	• Senior Officials' Meeting (Friends of the Chair on Connectivity)
Structural reform	• Economic Committee (EC)
Linking to global value chains	• Committee on Trade and Investment (CTI) • Small and Medium Enterprises Working Group (SMEWG)
Infrastructure investment	• CTI • Senior Finance Officials' Meeting (SFOM) • Transportation Working Group (TPTWG)
Financial inclusion	• SFOM
ICT infrastructure and utilisation	• Electronic Commerce Steering Group (ECSG) • Telecommunications and Information Working Group (TEL)
Promoting PPP and FDI	• CTI • EC • Investment Experts' Group (IEG) • SFOM • APEC Business Advisory Council (ABAC)*
Tourism development	• Tourism Working Group (TWG)

Human capital development	• EC • Human Resources Development Working Group (HRDWG) • Health Working Group (HWG)
Energy security	• Energy Working Group (EWG)
Natural resource extraction	• Agricultural Technical Cooperation Working Group (ATCWG) • Expert Group on Illegal Logging and Associated Trade (EGILAT) • Mining Task Force (MTF) • Oceans and Fisheries Working Group (OFWG)
Disaster resilience	• Emergency Preparedness Working Group (EPWG)
Urbanisation	• Senior Officials' Meeting (Friends of the Chair on Urbanisation)

Note: Mapping is indicative and not necessarily exhaustive. * ABAC is the private sector arm of APEC.
Source: Authors.

Remote areas have many needs and challenges, but they can also hold untapped economic potential. While the work of other international organisations is important in filling the infrastructure and social services needs of remote areas, APEC can complement this work by examining the economic potential of often overlooked remote areas and developing a coordinated plan for regional cooperation in this area. Regional cooperation can play a key role in knowledge sharing and capacity building that will enable economies and the private sector to identify remote areas with strong potential to contribute to economic and trade growth.

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ANNEX A: SUMMARY OF RESPONSES TO THE APEC QUESTIONNAIRE ON REMOTE AREAS DEVELOPMENT AND INTEGRATION

Question	AUS	CDA	CHL	INA	JPN	ROK	MAS	PNG	PE	RUS	CT	THA	USA	VN
There is an exact definition of RA in the economy (at the economy level)	-	-	+	+	-	-	-	+	-	-	-	+	-	-
The term 'remote area' is often mixed with the term 'rural' area whether in definition or in statistical data (at the economy-level)	-	-	-	+	+	-	+	+	+	-	-	+	+	-
There is an economy-wide information resource presenting statistical data on remote (not rural) areas	+	+	+	+	+	-	+	-	-	-	+	+	-	-
There is more than 1 type of remote (not rural) areas in the economy (some categorisation exists at the sub-economy level)	+	+	+	+	+	+	-	-	-	-	+	+	-	+
RA have some special status in the economy (due to their remoteness)	+	+	+	+	+	+	-	-	-	-	+	-	-	-
RA face economic challenges due to their isolation / distance from other areas	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Economy-level policy is applied to address the problems of RA	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Special legislation focusing on the development and integration of RA has been enacted in the economy	+	-	+	+	+	+	+	+	-	+	+	+	-	+

Government programs on RA development are being implemented in the economy	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Special funds for RA development are regularly being provided by the government	+	-	+	+	+	+	+	+	-	+	+	+	-	-
RA in the economy are highly dependent on the central/federal government for financial support	+	-	N/A	+	+	+	+	+	+	+	N/A	+	+	-
Whether the economy is willing to participate in future APEC work streams on RA development and integration	+	-	+	+	+	+	+	+	+	+	+	+	N/A	N/A

Notes: RA = remote areas; + = yes; - = no; N/A = not applicable or no answer.
Source: APEC economies' responses to the APEC Questionnaire on Remote Areas Development and Integration.