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Opportunities and Challenges for First-mile Development in Rural Hawaiian Communities

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INTRODUCTION

Increasing recognition of the 'digital divide' faced by First Nations communities in Canada and the United States has highlighted the role of community-driven broadband development in improving the quality of life and enabling self-determination in indigenous communities. Like other First Nations, Native Hawaiians struggle with linguistic and cultural preservation, and to gain equal access to educational and economic opportunities and health care. Many rural communities, including those comprised of indigenous Hawaiians, suffer from a lack of critical infrastructures. To date, efforts to address these disparities through information and communication technology (ICT) deployment have focused on a top-down approach at both the federal and state level, with the exception of limited community-based efforts that have largely focused on urban gaps and are not specific to Native Hawaiian concerns. In this paper, we describe specific challenges faced by Native Hawaiian communities in developing affordable, high-quality broadband access. We begin with a review of discussions about community-driven broadband development and digital self-determination, and then present Hawai'i as a case with unique physical, political, and socio-cultural challenges. Finally, we conclude by exploring the potential for community-initiated broadband projects that will enable more self-determination for indigenous Hawaiians in the planning and management of broadband networks and services.

COMMUNITY-DRIVEN BROADBAND POLICY

ICT infrastructures integrate themselves within a web of socio-technical elements. According to Kim, Kelly, and Raja (2010), broadband policy is best thought of as an "interconnected multilayered ecosystem" (p. 15). Within this ecosystem, a broad range of stakeholders interact and subject the development of broadband infrastructure to social, economic, and political factors. Stakeholders comprise media policymakers, governments, telecommunication service providers and local communities. However, media policymaking is hierarchical, centralized, and market-oriented, following a "rationalistic linear direction, with simple objectives and top-down decision making" (Ramirez, 2007, p. 89). For the United States, broadband policy is driven by market forces "primarily dominated by a duopoly of the telephone and cable companies" (Techatassanasoontorn, Tapia, & Powell, 2010).

Given the reluctance of telecommunication companies to service unprofitable areas, municipalities have attempted to address the inequitable distribution of broadband networks. Justifications for public investment in local broadband solutions include promoting economic development, developing e-government, promoting civic engagement, and narrowing the digital divide (Middleton & Byrne, 2011; Tapia, Kvasny, & Ortiz, 2011; Wolff, 2011). Often these initiatives are public-private partnerships operating along a spectrum of various network ownership and pricing schemes (Hudson, 2010). Cities that espouse utopian goals such as affordable broadband have significant challenges meeting these aspirations. For example, Tapia, Kvasny, and Ortiz (2011) noted a tension between the public rhetoric of digital inclusion by city officials and the reality of profit maximization among the private companies that had developed municipal networks. Hudson (2010) concluded that municipalities need to understand user demand particularly among low-income and disadvantaged populations and also the context where political and business cultures may collide. Applying Actor-Network Theory, Po-An Hsieh et al. (2012) observed these same tensions between government and service

providers. In addition, the authors discovered tensions between the government and residents. Advantaged residents, who did not adopt municipal broadband, attacked the broadband initiative as an unfair subsidy to socio-economically disadvantaged residents. Overall, the complexities of deploying broadband solutions through municipalities have led to an increase in the number of municipal projects that have been abandoned or failed (Tapia, Powell, & Ortiz, 2009).

In opposition to the "top-down" approach offered by municipalities and other telecommunication service providers, underserved rural and remote communities reflect a need for alternative approaches to developing broadband infrastructure. Ramirez (2007) argues that rural and remote communities "tend to be complex, dynamic, and subject to multiple policies and influences, often beyond the comprehension of urban-based policymakers" (p. 89). Echoing this sentiment, Tapia et al. (2009) note that the typical tensions between municipalities and private industry may appear distant to local communities. The next section will highlight some different community-based approaches toward broadband development.

Recent research on broadband implementation argues that the best approach is one that incorporates both top down elements and bottom-up community driven goals. Using a comparative case study among three different geographic contexts, Tapia et al. (2009) found the most sustainable broadband models were local wi-fi networking projects that encouraged integration with local community organizations. Terming this a public hybrid approach, key elements of the network are identified as digital inclusion strategies, community capacity, media and community content, and public service. Applying a hybrid approach has the greatest potential to deliver broadband services that are "affordable, nondiscriminatory, and universally available in order to ensure universal access to all" (p. 370). Likewise, Middleton and Bryne (2011) studied a user-generated wi-fi networking hotspot project and concluded that user-generated approaches can "contribute to useful islands of connectivity in the short term" but are "unlikely to provide the usable, reliable infrastructure needed as a platform for a digitally engaged citizenry" (p. 173). Public hybrid broadband emphasizes not only the technological infrastructure of the network but also situates the network within a context of the existing stakeholders and community. As such, this approach to infrastructure development helps to move media policy toward a balance between social goals and economic development. As noted by McMahon (2011), hybrid approaches privilege decentralized, local, and participatory governance structures which are in line with the goals of community informatics (Gurstein, 2003).

Another approach to broadband policy privileges the unique needs of rural and remote communities. As mentioned earlier, typical approaches to broadband development favor solutions located far from local communities. This last-mile approach frames rural and remote communities as 'problems' that are "addressed by simply linking unserved communities to already existing systems and infrastructures" (McMahon et al., 2011, para. 4). In contrast, the ``First Mile`` approach places decision-making about broadband development firmly within the specific needs of local communities. In addition, these initiatives seek to address the digital divide in "ways that support community-based involvement, control, and ownership" (para. 4). Through control and ownership of the ICT infrastructure, the First Mile approach is well-suited to serving the needs of First Nations communities and governments which have been historically subject to "paternalistic, colonial-derived development policies" (para. 1).

Research on First Nations and ICTs contends that the First Mile approach has particular resonance for indigenous peoples for two reasons. One is the lack of infrastructure present in First Nation communities. Sandvig (2011) highlights several factors that prevent Native Americans from accessing ICTs. Private telecommunication providers are uninterested in these communities because of undesirable demographics, difficult terrain, and legal barriers due to Native sovereignty. There is also a lack of technical expertise within the Native American community itself.

Another reason relates the need of indigenous peoples to balance equitable access to ICTs with unique, locally-grounded indigenous rights, cultural identities, and resources (McMahon et al., 2011, para. 19). For example, Christen (2012) challenges the common Internet meme that "information wants to be free" noting that that the meme "does a disservice to the task of understanding the ethics of information circulation" (p. 2877). Christen argues to recognize the alternative ways of imagining information creation, circulation, and the practices of access among Indigenous communities. This requires understanding the significance of cultural protocols regarding the distribution, circulation, and reproduction of cultural materials and knowledge. For example, ritual objects can be "disconnected from the practices, people, and places that they need to be efficacious" (p. 2885). By understanding cultural protocols observed by indigenous communities, we begin to define the parameters of online access to cultural information. In this way,

effective First Mile broadband policy becomes a path toward digital self-determination (McMahon, 2011).

SELF-DETERMINATION

ICTs have the potential to enable agency and self-determination for indigenous communities and other disadvantaged groups. In this sense, self-determination refers to using ICTs to acquire greater freedoms and rights, political recognition, and community identity and empowerment (Bandias, 2010; Mignone & Henley, 2009a, 2009b; Singleton et al., 2009). According to Mills (2002), the Internet functions as a tool for self-determination in two ways:

> *First, because it can provide access to a wide variety of information across borders to members of the group, it can foster a sense of identity. This is particularly important for dispersed groups such as the Kurds or Tibetans. Second, it can provide a new way to act in the global political realm to lobby on many different fronts for its self-determination claims. Such "cyberdiplomacy" can be important for both territorially dispersed and territorially compact groups. (p. 80)*

McMahon (2011) compared the strategies of indigenous groups on broadband development policies in both the United States and Canada and identified greater opportunities for cyberdiplomacy among indigenous groups in the United States. This was due to a "clearly defined, formal relationship between federal policymakers and indigenous communities" (p. 132). This formal relationship provided an avenue for Native Americans to critique federal funding allocation strategies where they failed to consider the unique context of developing broadband in their communities. As a result, McMahon documents the successful incorporation of "digital self-determination" as cyberdiplomacy in U.S. national broadband development policy (p. 131).

Self-determination can also occur through community ownership of the ICT infrastructure thereby encouraging the development of agency, social capital, and empowerment. Mignone and Henley (2009a, 2009b) demonstrate the value of applying a social capital analysis of ICT implementation in Aboriginal communities in Canada. In doing so, their research highlights not the technology, but rather the relationships and norms that are strengthened particularly by owning the ICTs and thus the "means of production" (2009b). Similarly, Singleton et al. (2009) note how endogenous ICT initiatives foster empowerment more effectively than external, or top-down, approaches.

In the following section, we investigate the unique policy context that comprises Hawai‘i. We adopt a case study approach, first describing the unique characteristics of Hawai‘i; then discussing the current deployment of broadband and also policy statements from key stakeholders in the broadband arena. Lastly, we analyze the possibilities for greater self-determination among Native Hawaiians through broadband access to ICTs.

THE CASE OF HAWAI‘I

Hawai‘i is the most geographically isolated population center, a volcanic island chain with seven populated islands located in the central Pacific Ocean. Nearly 290,000 descendants of the Polynesian people who settled the Hawaiian Islands live in Hawai‘i today, constituting 21.32% of the total state population (U.S. Census Bureau, 2010). At the time of first Western contact in the late eighteenth century, Native Hawaiians had a complex society, with a stable political order, a sustainable economy based on fishing and agriculture, and a rich culture and spoken language, ‘Ōlelo Hawai‘i (Van Dyke & MacKenzie, 2006). Like many other First Nations groups, Hawaiians face the challenge of revitalizing and preserving traditional language and cultural practices that have been replaced or eroded as the result of centuries of Western influence.

The indigenous people of Hawai'i, or *kānaka maoli*, may share many challenges with other First Nations groups in the United States and Canada. However, there are a number of unique characteristics that have shaped Hawaiian ethno-cultural identity and legal status. One important distinction is that Hawaiians do not constitute a tribe by law. This distinction arises from Hawai‘i's colonial history. In 1893, the independent Kingdom of Hawai‘i was overthrown by a small group of non-Hawaiian residents who established a provisional government in violation of international law. Hawaiian lands were taken from the kānaka maoli and ‘Ōlelo Hawai‘i was forbidden in schools (Andrade & Bell, 2011). Hawai‘i was ultimately annexed by the United States, becoming the Territory of Hawaii.[i]

Decades later, in 1959, Hawai'i was admitted to the Union as the fiftieth state.

As a whole, the Native Hawaiian population is underrepresented in educational attainment, experiences poorer health, and has a lower-than-average median income (Asian and Pacific Islander American Health Forum, 2010; White House Initiative on Asian Americans and Pacific Islanders, 2010). As a result of these developments, "Native Hawaiians are now at the bottom of the socio-economic scale in their own islands" (Van Dyke & MacKenzie, 2006). Further, although indigenous populations have unique characteristics and should not be combined in the rubric of "rural and remote communities" (McMahon, 2011), a disproportionate number of Native Hawaiians live in rural or remote areas of the state that are less likely to have affordable broadband offerings. Therefore, Native Hawaiians stand to benefit from acquiring effective access and use of the Internet to improve chances to be a productive, active, and informed citizen (Gurstein, 2009; Mossberger et al., 2007; Servon, 2002; Katz & Rice, 2002). However, outside of policy rhetoric, there is little evidence that broadband deployment has focused on the specific needs of the Native Hawaiian community.

BROADBAND IN HAWAI'I

The *Hawaiian Homes Commission Act* (1921) led to approximately 200,000 acres of land placed in trust for Native Hawaiians by the state of Hawai'i (Andrade & Bell, 2011). In total, there are 75 Home Land areas with a total population of 30,858 spread over remote areas of six islands (United States Census Bureau, 2010).[ii] An estimated 17 percent of Hawai'i's rural population, representing about 7,700 households, currently has no access to broadband ("Hawaii gets help providing broadband to rural areas", 2012). Native Hawaiians represent a disproportionate number of those living in underserved areas. This represents approximately 9,800 families living on Hawaiian Home Lands, with an additional 25,000 awaiting deployment of necessary infrastructure (Hee, 2012 Jun 7).

Following United States telecommunications reform in 1996, the Federal Communications Commission created the Universal Service Fund (USF), which includes a program to provide affordable telecommunications for high-cost rural and remote areas. Sandwich Isles Communications (SIC) is a telecommunications company that has been licensed by the Department of Hawaiian Home Lands since 1998 to be the exclusive provider of telecommunications services in the Hawaiian Home Lands. At present, some tracts are served by the local incumbent, Hawaiian Telecom, but the majority receive service from SIC. This was described as a step towards ensuring access to the economic, educational, and social benefits of broadband for all Native Hawaiians. In 2008, SIC received $13,408 for each of 1967 lines to Hawaiian Home Lands residents, in some cases drilling through lava to lay fiber-optic lines. Over the past several years, there have been many challenges to the USF fund use for High Cost Areas, with SIC cited as an example of fund abuse (United States House of Representatives, 2009). In May, 2013, the FCC rejected SIC's request for a decade-long waiver of new rules intended to reduce fraud and abuse of the USF.

The *Universal Service Reform Act of 2010* was intended to modernize the USF by shrinking its size and focusing on broadband deployment. Currently, the FCC's National Broadband Plan includes proposals to replace some USF components with the Connect America Fund (Hudson, 2011; Holt & Galligan, 2012). This plan will provide Hawaiian Telecom with $400,000 to subsidize broadband provision to 519 households ("Hawaii gets help providing broadband to rural areas", 26 July 2012). However, this reform includes capping rural service provider subsidies, leading to up to a 33% reduction in revenue. First Nations groups testifying before Congress in 2012 argued that these changes will create an environment in which small companies cannot survive, leading to bankruptcies or drastic reduction in service. The President of SIC, Albert Hee, explained to Congress that "I may be forced to tell the more than 6,400 Native Hawaiians who have come to rely on my company for life-saving telephone service and life-changing broadband connectivity, that we can help them no more" (Akaka, 2012, para. 14). In a separate testimony before Congress, Hee argued that:

> *Affordable broadband helps native Hawaiians to overcome their geographic isolation by providing access to healthcare, education, commerce, public safety, and social interaction. It also provides native Hawaiians with an unprecedented opportunity to further our cultural revitalization -- preserving, protecting, and promoting our culture for generations to come." (Hee, 2012, para. 3)*

At the state level, in August, 2011, Governor Neil Abercrombie announced the "Hawai'i Broadband Initiative", an economic development project intended to provide affordable

ultra-high-speed Internet access to all Hawai'i citizens by 2018 (Office of the Governor, State of Hawai'i, 2011). The plan, like the Hawaii Broadband Task Force report in 2008 (Auditor, State of Hawai'i, 2008), focuses on economic development. While the digital divide is addressed, the unique needs of Native Hawaiians are not specifically mentioned. At the state level, Kokua Wireless is a community-based initiative to provide free wireless to those who cannot afford it (kŌkua means to assist or cooperate). Spearheaded by a technology entrepreneur and the CIO of the City and County of Honolulu in 2005, the project is self-funded by volunteer businesses or individuals who purchase an antenna to share Internet access via wi-fi (Kokua Wireless, n.d.). Initially limited to the urban center of Honolulu, it has expanded to other areas on the islands of O'ahu, Hawai'i, Maui, and Kaua'i. This project is laudable and represents a true community-based effort, but it is limited to urban centers and would not scale to areas that lack basic infrastructure.

HAWAIIAN SELF-DETERMINATION

In 1993, a century after the overthrow of the Hawaiian monarchy, President Clinton apologized on behalf of the United States for its role. By confirming in the Apology Resolution that Native Hawaiians are an "indigenous people", Congress characterized the relationship between the United States government and Native Hawaiians as being "political", rather than "racial" (Van Dyke & MacKenzie, 2006). This moved Hawaiian sovereignty claims forward and also clarified the obligations of state and federal governments towards Native Hawaiian welfare.

A growing movement for Native Hawaiian rights and legal scholars' demonstration of the illegality of the 1893 overthrow formed the basis for the Hawaiian Sovereignty and Self-determination movement (Andrade & Bell, 2011). Among Native Hawaiians there is no consensus about what sovereignty should entail. Competing models include total independence, a nation-within-a-nation, or quasi-independent state organizations such as the Office of Hawaiian Affairs. The Office of Hawaiian Affairs (OHA), created in 1978 as a semi-autonomous organization within the State of Hawai'i, manages 1.8 million acres of royal lands that are held in trust for Native Hawaiians. OHA's mission statement reads: "To mālama (protect) Hawai'i's people and environmental resources and OHA's assets, toward ensuring the perpetuation of the culture, the enhancement of lifestyle and the protection of entitlements of Native Hawaiians, while enabling the building of a strong and healthy Hawaiian people and nation, recognized nationally and internationally (Office of Hawaiian Affairs, n.d., para. 2). OHA has positioned itself to be involved with any future Hawaiian government that emerges. Despite differing opinions within the Hawaiian community about what form sovereignty should take, according to Andrade and Bell (2011), there is agreement on the following four principles:

> *1) Formal U.S. recognition that Hawaiians are the indigenous, first nations people of Hawai'i; 2) self-determination of Hawaiian ethno-cultural identity, traditions, language, and practices; 3) restitution for the loss of lands, language, education, livelihoods, and health stemming from wrongs intentionally or unintentionally perpetrated by America; and 4) restoration of a native land base formed by HHCA [the Hawaiian Homes Commission Act of 1921] and ceded (Hawaiian Crown and government) lands. (p. 25)*

Since 2000, various forms of a bill seeking to initiate a process through which Native Hawaiians can seek federal recognition as a sovereign group have been brought before Congress. This *Native Hawaiian Government Reorganization Act* (introduced by chairman Senator Daniel Akaka in the U.S. Senate Committee on Indian Affairs) would create a basis for the establishment of a Native Hawaiian nation within the United States. The current form of the bill integrates a new Hawai'i state law that created a roll commission seeking to identify and list Native Hawaiians. At present, the Office of Hawaiian Affairs is gathering names for this Kana'iolowalu registry (Office of Hawaiian Affairs, 2012). Once completed, the roll will be published, and a convention will be held to develop a "Hawaiian government entity" (Reyes, 2011, para. 23). Within the Hawaiian community, there are some who believe that the passage of the Act would actually harm Native Hawaiians' ability to form a sovereign, independent nation. This internal conflict has been cited by members of Congress as a means to deny passage of the bill (Reyes, 2011).

A second characteristic that distinguishes Native Hawaiians from other groups is the size and dispersion of the Native Hawaiian community. The majority of Hawaiians are mixed race, "thereby making race or blood quantum an inadequate measure of Hawaiian identity" (Andrade & Bell, 2011, p. 20). In the 2010 United States census, 527,077 individuals identified themselves as Hawaiian, and the Kana'iolowalu registry would

potentially be open to any of these individuals.

A cultural renaissance in the 1970s has led to a resurgence of interest in Hawaiian culture and language. Once considered a dying language, ʻŌlelo Hawaiʻi now has over 24,000 speakers in Hawaiʻi (United States Census Bureau, 2010) and is one of two official state languages. Hawaiian is the only native language in the United States that is increasing its number of native speakers, in part due to a series of highly successful language immersion schools where all students are taught in Hawaiian (Staton, 2005). McCarty (2003) notes that "immersion schooling has succeeded in strengthening the Hawaiian mauli [essence of life], awakening consciousness and self-determination within the Native Hawaiian community, and enhancing children's academic success" (p. 154). In addition to the immersion schools, there are a number of academic programs working to support and revitalize Hawaiian culture. These include the Kamehameha Schools (k-12 education) and a number of undergraduate and graduate degrees in Hawaiian language and culture throughout Hawaiʻi. Web-based resources such as Ulukau, a "Hawaiian Electronic Library", make a wide array of learning materials available, including Hawaiian language newspapers from the 19th and 20th centuries (Ulukau, n.d).

HAWAIIAN DIGITAL SELF-DETERMINATION

The previous section documented the empowerment of Native Hawaiians through cultural and political self-determination efforts. An important question remains concerning the potential for Native Hawaiians to employ ICTs to acquire digital self-determination. As seen above in the example of language regeneration, the tremendous potential for ICTs to increase self-determination has not been lost on Native Hawaiian groups. However, the experience of municipalities offering top-down broadband development policies provides little evidence for fostering social inclusion. Attempts to apply the policy rhetoric of digital inclusion to broadband development risk a "further mistrust of authority and an exacerbation of cultural problems at the root of social exclusion" (Tapia et al., 2011, p. 225). In addition, the current somewhat parallel ICT policy frameworks in Canada fail to acknowledge the specific and diverse contexts of Indigenous groups (McMahon et al., 2010; Mignone & Henley, 2009a; 2009b). In contrast, tribal governments in the United States have been able to establish formal relationships between federal policymakers and indigenous communities that recognize digital self-determination. Former Hawaiian Homelands Commissioner Alapaki Nahale-a invoked Congress' responsibilities, noting, "We believe ensuring equitable access to broadband is an important step in Congress's clear intent of advancing the rehabilitation and welfare of native Hawaiians" (Department of Hawaiian Home Lands, 2011, para.2). Given the contested claims to sovereignty for the Native Hawaiian community and their geographic dispersion, the Internet may be an ideal tool to provide a wide variety of information among a politically and geographically dispersed group (Mills, 2002). Therefore, what is needed is for Native Hawaiians to advocate for culturally-informed and community-driven ICT strategies at the federal, state, and local level (McMahon et al., 2010).

OCAP (OWNERSHIP, CONTROL, ACCESS, AND POSSESSION) AND NATIVE HAWAIIANS

The principle of ownership, control, access, and possession (OCAP) is best defined as self-determination applied to research (Schnarch, 2004). OCAP represents "a political response to tenacious colonial approaches to research and management" and has become a "rallying cry to many First Nations" and a "wake up call for researchers" (p. 80). Given Hawaiʻi's colonial history (Trask, 1984; Turnbull & Ferguson, 1997), we adhere to these principles to guide our own understanding of research on the potential of broadband networks to meet the social, political, cultural, and community needs of Native Hawaiians. O'Donnell et al. (2011) has provided a helpful way forward by linking the principles of OCAP to self-determination and broadband networks:

> *First Nations must retain access and possession of the capacity and resources to effectively manage the content, traffic and services on their local network. Second, that First Nations have a right to own and control the local broadband network in their communities in order to support the flow of information and services. (p. 5)*

One potential way to link OCAP principles with both Native Hawaiian's self-determination and the benefits of broadband availability is by strengthening the assertion of Hawaiian values. Trask (1984) argued that the Hawaiian cultural revival in the 1970's and 1980's began a process of mental decolonization which led to cultural revival and political

organizing. As a result, the recognition of indigenous Hawaiian values marked a strong contrast to Western culture:

> *Hawaiian values revealed a culture whose religion, politics, and economics were grounded in a fundamental love for the land and its people. This culture presented an admirable - and to many Hawaiians - a preferred alternative to the haole or Western way of life. (Trask, p. 126)*

Watson (2010) noted that in pre-contact times:

> *With a lack of motorized transportation, most travel required people to sleep out beneath the sky. We made do in nature's many elements. Our intimate relationship with our Earth Mother, Papahanaumoku, and Sky Father, Wakea, granted us exemplary knowledge about navigating the land and utilizing it to survive. To sleep out on the land was to sleep in the bosom of our Mother, and since the dawn of time, humans have known no greater or more confining rest than when lying against their Mother's heart. (p. 125).*

In addition to valuing the land, Handy and Pukui (1958) and Watson (2010) describe the kauhale living system of pre-contact Hawai‘i that placed strong value in the kinship of the extended family. The kauhale system provided "greater social and community support for all individuals" (Watson, 2010, p. 126). Disease brought in by foreigners ultimately undermined the kauhale system by reducing the numbers of family members available for land and community responsibilities with a "cumulative effect on the extended family and family systems in Hawaii" (p. 127). As a result, Native Hawaiians:

> *out of necessity left their kauhale living systems, and moved into the growing urban environments developed to suit the needs of missionaries and western businessmen. The mimicry of western living in Hawai‘i's growing urban sectors reflected the foreigner's desire to model life in Hawai‘i after their places of origin. (p. 127)*

Land and kinship are two examples among others where broadband can advance the assertion of indigenous values among Native Hawaiians. O'Donnell et al. (2011) demonstrated that OCAP principles helped the Fort Severn First Nation to improve government, health, and education services. These services were identified as community priorities through intensive community workshops and consultation with Fort Severn community members. In a similar way, we believe that OCAP principles applied to broadband may offer ways to assert indigenous Native Hawaiian values such as land and kinship. However, we offer this suggestion as only a possible way forward for Native Hawaiian self-determination and broadband. As Schnarch (2004) reminds us, research is a tool for promoting changes that can transform people's lives. As researchers, we adopt OCAP as a practice that places, at the forefront, the understanding that "American values and economics have undermined and transformed Hawaiian culture" thus "increasing racial oppression and exploitation of Hawaiians" (Trask, p. 108). Within this space, we believe a participatory research plan can deliver significant benefits to Native Hawaiians and their communities through Native Hawaiian ownership, control, access, and possession of broadband networks and applications.

NEED FOR BROADBAND

In this section, we highlight several instances demonstrating a need for broadband to serve Native Hawaiian interests.

In April of 2013, the Office of Hawaiian Affairs announced the launch of their website, "Kamakako‘i: The Cutting Edge", designed to further engage the Native Hawaiian community in addressing indigenous concerns (Office of Hawaiian Affairs, 2013). The website gives voice to issues important to the Hawaiian community and provides effective interactive tools for political mobilization. It offers forums for discussion, information on legislation, email alerts, informative videos and the ability to utilize social media sites to share content. Another entity that takes full advantage of the new technological capabilities of broadband is ‘Ōiwi TV, a Native Hawaiian television station established in 2009. It offers high quality media rich content that utilizes Cloud TV technology to deliver interactive content and video on-demand to television and all mobile devices. The channel delivers community based education, entertainment and commerce to its 220,000 Hawaiian households (‘Ōiwi TV, 2011).

Hoʻolaupaʻi, part of the Ulukau digital archive of Hawaiian language materials, is a collection of Hawaiian-language newspapers that were published between 1834 and 1948. Digital images of dozens of newspapers are included for use by those studying Hawaiian language and history. Project contributor Keola Donaghy notes that "Because of this access, and the number of people who have and are achieving fluency in Hawaiian, we are no longer dependent on translations, sometimes dubious, of these source materials, or non-Hawaiian accounts of events of that era… It is helping to broaden the base of Hawaiian knowledge, which provides a firmer foundation to move into the future." ("Keiki Kawaiʻaeʻa and Keola Donaghy, Hawaiian language: Digitization of Hawaiian language source materials", 2010, para. 8).

While the examples of the Kamakakoʻi, ʻŌiwi TV, and Hoʻolaupaʻi projects show a desire and ability within the Native Hawaiian community to create culturally-enriching media, as with many other underserved populations, Native Hawaiians have lagged behind other races with respect to accessing and using the Internet. A 2003 study on online health information practices among Asian Americans, Native Hawaiians, and other Pacific Islanders found that "lack of Internet access is a major issue for Native Hawaiians" (Office of Disease Prevention and Health Promotion, Section 3).

Research by Jayakar and Park (2012) determined that the demand for public computing Internet services (ex. public libraries) indicates an unmet need for broadband. For example, low usage of public computing Internet services within a community may require a campaign "to educate the public about Internet use and provision of computer literacy and technical assistance" (p. 57). For Native Hawaiians, we believe this is not the case. A recent national survey of public library computer centers found that 32% of the American public 14 years old or older have accessed the Internet using a library computer or wireless network within the last two months. Public Internet access in libraries was highest among people of mixed race and Native Hawaiians or Pacific Islanders (Becker et al., 2010, p. 32). 72% of library and computer network users checked email, and this was the highest among people of mixed race, Blacks or African Americans, Native Americans or Alaska Natives, and Native Hawaiians or Pacific Islanders (p. 34).

Furthermore, almost two-thirds of users used library computers on behalf of another person to seek information or carry out an instrumental activity. The use of library technology was highest among people of mixed race, Blacks or African Americans, American Indians or Alaska natives, and Native Hawaiians or Pacific Islanders. One of the authors spoke with two public librarians at the Naʻālehu Public Library on the Island of Hawaiʻi. This library serves a predominant population of Native Hawaiians. In conversation, they confirmed the findings from the national survey noting the popularity of Wi-Fi access and their two public computers (personal communication, July 25, 2013). Because Native Hawaiian populations, particularly those in rural areas such as Naʻālehu, may lack access to broadband, many members of the community are not able to access or take part in projects like Kamakakoʻi, ʻŌiwi TV, or Hoʻolaupaʻi. We conclude with some thoughts on fulfilling the potential and promise of First Mile broadband policy in Hawaiʻi.

CONCLUSIONS

This exploratory study described challenges faced by Native Hawaiian communities in developing affordable, high-quality broadband access. Hawaiʻi was presented as a case with unique physical, political, and socio-cultural challenges. We noted that, at present, a top-down approach at both state and federal levels limits community-initiated broadband projects that will enable indigenous Hawaiians greater digital self-determination. This research raises the question of to what extent Native Hawaiians can achieve similar broadband policy gains in comparison to other First Nations groups. At the very least, current broadband policy in Hawaiʻi requires a shift from a technological imperative to one focused on culturally-informed and community-driven ICT strategies. Research exploring the digital divide in Hawaiʻi is limited at present, but our research highlights two areas for future concern: 1) the perspectives of Native Hawaiians living in rural and remote communities, and 2) a critical examination of public discourse around broadband policy in Hawaiʻi.

ENDNOTES

i. Where appropriate, we use diacriticals to reflect Hawaiian spelling of words (e.g., Hawaiʻi). In some cases, the proper name of the entity does not employ these, so they are omitted (e.g., Territory of Hawaii).

ii. Of 75 total areas, 55 were reported as populated in 2010.

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