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Beyond access: A relational and resource-based model of household Internet adoption in isolated communities☆

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ABSTRACT

Isolated rural communities face specific challenges associated with their geographical context in the digital inclusion process. Thus, based on a relational and resource-based model as well as diffusion research, this study explored personal, positional factors, as well as material and social resources of household Internet connection in remote communities that received infrastructure access for the first time between 2010 and 2011 in Chile. A face-to-face representative survey conducted in 22 communities revealed that, among personal variables, age and innovative personality played a role in household Internet adoption. Material resources such as income and transport connectivity were also relevant. However, social resources were among the most significant predictors. That is, the presence of children in the household and larger social networks were associated with greater chances of Internet connection.

1. Introduction

Public policies that promote ICT access and higher levels of connectivity are guided by the premise that lack of adequate infrastructure excludes people from economic growth and participation in a global society (Siteal, 2012). This is particularly relevant for isolated rural communities because they are lagging behind not only in technological infrastructure but also in economic and educational resources (e.g., Castells, 2000; Salinas & Sánchez, 2009; Williams, Philip, Farrington, & Fairhurst, 2016). Research has found that Internet connection would benefit these areas because it would help overcoming geographic distance, promote access to resources and opportunities, and encourage social interactions and community attachment, which would lower the possibilities of out-migration and stimulate economic development (Salemink, Strijker & Bosworth, 2015; Whitacre, Gallardo, & Strover, 2014; LaRose, Gregg, Strover, Straubhaar & Carpenter, 2007). These premises have sparked several efforts to promote broadband connection in rural areas in both developed and developing countries (e.g., Roberts, Anderson, Skerrat & Farrington, 2016; LaRose, Gregg, Strover, Straubhaar, & Carpenter, 2007). In Latin America, several programs have targeted rural areas. For example, in Brazil the government developed a plan to further Internet adoption among rural youth; in Bolivia, it implemented broadband access in strategic rural community places such as telecenters, schools and community centers; in Argentina and Colombia the connection efforts have targeted public schools from isolated areas (Siteal, n.d.); and in Chile in the last five years the government has subsidized infrastructure connection in more than 1400 areas that had limited or no connectivity. Despite these policy efforts and the increasing access and availability of ICTs, the rate of adoption and usage in rural communities is not the same as the urban ones (Rivera, Lima, & Castillo, 2014; Scuro & Bercovich, 2014).

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This evidence suggests that access to technological infrastructure is not sufficient. Therefore, it is necessary to take into account multiple challenges to attain Internet adoption and a more complete digital inclusion process (e.g., van Dijk, 2005). Furthermore, researchers have shown the importance of focusing on elements that are not directly related to technological factors in order to explain lower levels of ICT among disadvantaged populations (e.g., Marien & Prodnik, 2014; Williams, Farrington, & Philip, 2015; van Deursen & Helsper, 2015). For example, investigations found that interpersonal networks and geographical distance played a role in people's technological engagement in rural settings (Collins & Wellman, 2010; Ferrari, 2012; Wilkinson, 2010). Furthermore, previous qualitative research found that in remote communities, the geographic isolation, young people out-migration and communities' economic activities molded villagers' needs and attitudes towards new experiences, including their adoption of digital technologies (Correa & Pavez, 2016).

Because digital inequalities mirror structural social inequalities (Robinson et al., 2015), this study takes a relational or network approach to understand digital inclusion (van Dijk, 2005), where people's context, position in a community, resources and social networks are necessary to understand their adoption of information and communication technologies (ICTs). This is particularly relevant in isolated rural communities as they face several challenges, including lack of resources and networks that act as barriers in technology adoption (e.g., Rennie, Crouch, Wright, & Thomas, 2013). Thus, relying on a relational or resource-based approach to study digital inclusion (van Dijk, 2005, 2012) as well as taking elements from Diffusion of Innovation theory (Rogers, 2003), this study investigates the factors associated with household Internet adoption in isolated rural communities. Specifically, based on van Dijk's model (2005, 2012), it explores how personal factors (gender, age and innovative personality), positional aspects (i.e., labor activity and level of education) as well as material resources (i.e, income, access to public services, transport connectivity) and social resources (social networks and presence of children in the household) explain people's level of Internet adoption in these isolated contexts.

To study these determinants, we conducted a face-to-face representative sample in 22 isolated rural communities located in northern, central and southern Chile. We define isolated communities as rural locations that received Internet access infrastructure through a public-private program for the first time between 2010 and 2011.[1]

1.1. Digital inclusion in rural areas: the case of Chile

The geographical gap is one of the biggest challenges in the Latin American region. The rough natural settings become an obstacle for technological infrastructure (Siteal, 2012). Despite the implementation of policies that focus on rural populations, it has been reported that Internet access is twice likely in an urban area rather than a rural one, difference that can be even ten times higher depending on the Latin American country studied (Balboni, 2009; Correa & Pavez, 2016).

To date, Chile is leader in the Latin American region with the highest Internet penetration rate, where 70% of the population goes online (Subtel, 2015). This is not a surprise given that this is a country that has long-established ICTs policies to boost Internet access and adoption. On this regard, infrastructure access has been a priority in the last two decades positioning Chile as one of the first countries in South America to develop a national ICT policy (Kleine, 2013). Despite these efforts, the rough geography of the country has posed great challenges to rural areas. The last governmental report shows that the rural-urban gap remains as the main obstacle to secure a connected country because only 42% of rural households have some kind of Internet access (Subtel, 2015). A relevant policy has been the creation of the Telecommunication Development Fund, which subsidizes the infrastructure required to connect geographically isolated areas that are not financially worthwhile for telecommunication companies. For instance, through the program "All Chile Connected," the fund has provided 3 G wireless connection, which can be accessed through mobile phones and 3 G modems, to more than 1400 rural isolated communities since 2010. As part of the public-private contract, Internet providers cannot charge more than they do in the nearest urban area.[2] Thus, Chile offers an interesting paradox of a country that provides high levels of connectivity, improvement of infrastructure in rural areas and several policy initiatives to increase the figures of online users, yet more than half of rural households do not have Internet connection.

Notwithstanding the variety of projects and points of view to understand digital adoption within rural communities, most research has focused on the exploration of sociodemographic elements. Among those, income and connection costs (for both devices and broadband) have been pointed out as the reason for low home Internet access (Agostini & Willington, 2010). Other research has discussed that income and connection service costs and limited access to devices can explain only a portion of the Chilean digital exclusion in rural communities (Rivera et al., 2014). In fact, the largest national survey about ICT adoption revealed that among rural people, the main reason for not adopting the internet in the household was lack of knowledge and usability (36%), then lack of relevance (31%), and the third reason was connection costs (equipment and service), which were named by 18% of the people (Subtel, 2015). This is mainly because lack of Internet adoption and development of digital literacy in rural areas reflects other larger social differences and inequalities that are inherent of these populations (Hale, Cotten, Drentea & Goldner, 2010; Rusten & Skerrat, 2008). Recognition of cultural differences and needs have also been pointed out as elements that are necessary to take into

[1] People of these communities can access to the Internet through their mobile phones, as well as desktops and laptops with the help of a mobile modem. Internet connection has been available only since the program started because they previously lacked access infrastructure.

[2] Each community has Internet connection provided through mobile communication systems 3G (directional antenna) in the 1900MHz band (one per town). This allows providing the service of data transmission and Internet access as well as the mobile phone service with a maximum power of 40W. The range of the antenna covers a minimum of the 90% of the territory defined by the National Telecommunications Office (Subtel) and all the houses that took part of this study are within this range. The maximum cost per connection is a one-time incorporation fee of US$ 42 and a monthly fee of US$ 21 (approximately) with unrestricted consumption. The speed offered is 1 Mbps downstream and 512 kbps upstream.