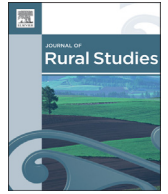


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Digital inequalities in rural Australia: A double jeopardy of remoteness and social exclusion

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ABSTRACT

In an era of a highly digitalized society, Australia's rural areas continue to be at a digital disadvantage. With the increasing penetration of information and communications technology (ICT) into all public and private realms, there is a need to examine the deeply rooted digital divide and how it is intertwined with issues of social exclusion in rural communities. This study focused on remoteness as an indicator of digital exclusion, and investigated its relationship with other dimensions of social exclusion. A secondary data analysis using Australian Bureau of Statistics (ABS) regional data revealed that remoteness was a strong predictor of home Internet and broadband connectivity, but digital divide was exacerbated by other socio-demographic factors such as educational levels and employment status. When implementing digital inclusion strategies, both supply (infrastructure) and demand (education levels, industry sector, employment opportunities, socio-demographics) factors must be considered.

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1. Introduction

As Internet and broadband penetration have increased, the digital divide issue has become less significant. However, rural areas continue to be at a persistent digital disadvantage when compared to their urban counterparts. Places, infrastructure and socio-demographics are often discussed as the main components of the lag in technology adoption. The place-based characteristics of rural areas are determined by their remoteness, which often leads to a lag in the adoption of new technologies and innovations (Whitacre and Mills, 2007). The costs associated with providing the infrastructure needed to support Internet and broadband connectivity are determined by the relative remoteness of the delivery site, and people living in rural areas are further disadvantaged by other social exclusion parameters such as their ages, incomes, and educational levels (Basu and Chakraborty, 2011).

This study examined the interplay between remoteness and socio-demographic factors that influence digital exclusion in Australia. Distance and low population densities increase the costs of building the network infrastructure needed to provide equitable access to these services. Australia has implemented a range of

regional telecommunications policies. However, rural areas continue to lag behind in Internet penetration and experience poorer broadband connectivity. They also pay more for the same services (2011–12 [Regional Telecommunications Review](#), 2012; ABS, 2013a). This is in part ascribed to demand levels in rural areas. Rural populations typically have lower educational levels and incomes, both of which are essential components driving ICT demand. Other factors include an aging population and dependence on primary sectors such as mining, agriculture and fishing (Salemink et al., 2015; Whitacre, 2010).

There are clear benefits of the Internet for those living at a distance from major services. There are many advantages of online services that are intended to overcome geographic distance, such as online education, health services and shopping (Freeman and Park, 2015). However, digital exclusion, unlike other types of social exclusion, is unique in that network externalities generated by ICT infrastructure can exacerbate digital disadvantages and create a vicious cycle. In densely populated areas, not only are the costs of laying the infrastructure and providing services lower due to economies of scale, but there is an indirect network effect that results from the critical mass that enables various services. This is especially so because the Internet—while having the potential of a truly global media—is in practice largely local (Gordon, 2008). For example, user rating services, such as Urbanspoon or Tripadvisor, only work if there are enough reviewers to provide ratings, giving

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an advantage to densely populated urban areas. Similarly, many location-based services such as Uber target cities. For this reason, connectivity may be perceived to be of lesser value to rural users compared to their urban counterparts.

Rural connectivity is a complex issue that is intertwined with many other factors. This study examined one aspect – remoteness – of rural areas that is linked with digital disadvantage by reviewing the state of connectivity in rural Australia, where the digital gap between rural and urban areas has not narrowed significantly in the past decade (ABS, 2013b, 2013c). Through a secondary data analysis of the Australian Bureau of Statistics data, this paper explored the overlapping parameters of digital and social exclusion.

2. Literature review

2.1. What is the rural ICT problem?

Digital inclusion is not simply granting access to the Internet. It is a multilayered concept that includes multiple dimensions of infrastructure, access, uses, and outcomes (Park et al., 2015). National level digital divide policies usually aim at equal provision of infrastructure in all geographic areas. Laying infrastructure where it may not be economically viable and providing access for disadvantaged groups are initial steps towards enabling digital inclusion. However, the provision does not automatically lead to adoption. In order for connectivity to be beneficial, individuals must be able to engage in effective uses (Park et al., 2013; Salemink et al., 2015). Digital divide policies have mainly focused on making sure services are available to everyone. However, studies on Internet users suggest that the ways in which people engage with the technologies may further widen the gap between those who are skilled and capable of using the services to their benefits and those who are not (Strover, 2014). This phenomenon is referred to as a second-level digital divide (Hargittai, 2002; van Dijk, 2006). The second-level digital divide can result from factors such as motivation, skills, untargeted policies and the local environment (Goldfarb and Prince, 2008; Strover, 2001). These complex and multidimensional gaps can be better described with the concept of digital exclusion (Park, 2012). Digital inclusion, therefore, includes not only the provision of infrastructure but user adoption and uses, and the resulting beneficial outcomes (Whitacre et al., 2015).

In rural areas, not only the cost of Internet connections and difficulties of access but the lack of skills hinder digital engagement (Salemink et al., 2015). Rural residents have lagged both in gaining access and proficiency, resulting in fewer economic or other benefits (Park and Kim, 2015). Stern et al. (2009) suggested three levels of digital inequality: access, skills, and opportunities. While getting access to technologies can largely be achieved through interventionist policies and efficiencies in the marketplace, acquiring the appropriate skills, or being able to use the technologies to facilitate daily activities, require further action. They also found that the quality of the connections available was an important factor determining both user proficiency and how people used the Internet in their everyday lives. Broadband connections are a better predictor of the frequency with which users would conduct online activities than are traditional demographic factors such as income, which means that a lower connection speed reinforce less usage of the service, thus creating a vicious digital cycle (Davison and Cotten, 2009).

To better understand rural digital exclusion, we must examine the various divides that exist and how they relate to other circumstances. It is often the case that existing social exclusion factors interact with the digital divide, creating a double jeopardy among rural citizens and organizations. Moreover, disparities in service

levels already experienced by rural communities may be further exacerbated as the digital economy advances (Townsend et al., 2013; Salemink et al., 2015).

Digital and social exclusion are known to be overlapping issues in rural areas (Mills and Whitacre, 2003). An analysis of Census of Agriculture data in the United States revealed that existing social divides were replicated in digital inequalities, and that this was a more pressing problem than infrastructural gaps in rural areas (Basu and Chakraborty, 2011). In other studies, geographic factors were emphasized. For example, the analysis by Hale et al. (2010) of a nationally representative 2005 Health Information National Trends Survey in the US suggested that people in rural areas used the Internet less than those in more populated areas, after controlling for age, gender, race, marital status, employment, and insurance status.

Another important dimension of the rural digital disadvantage arises from the nature of digital networks. Boase (2010) introduced the concepts of network externalities in explaining the disparity between urban and rural digital engagement. Having a direct connection to other people via the Internet increased the networks' value to users, which in the case of rural users was smaller. People find value in using the Internet to strengthen their local networks which the larger potential online network, the greater the value to the user (see DiMaggio and Cohen, 2004). Their analysis of nationally representative US data showed that Internet adoption was lower in rural areas because of the relatively lower levels of network externality. Network effects occurred when the value a person assigned to adopting a technology increased proportionately with the number of members in his/her social network who had already adopted the practice (DiMaggio and Garip, 2011, 2012). The fact that others can influence an individual's decision could result in higher levels of social inequality for those who are not surrounded by people who use the technologies. Those who belong to social networks with lower adoption rates are less motivated to use the technologies.

2.2. Benefits of digital infrastructure and engagement in rural communities

There are many potentially positive outcomes of internet connectivity in rural areas. The most commonly recognized benefits of rural connectivity are overcoming the barriers of distance through online services, increasing the levels of social capital among community members, and achieving economic gains by enabling participation in the digital economy. A report published by Digital Inclusion Initiative (2009) identified four areas of economic benefits from digital inclusion: education and employment, communication and connectivity, transactional efficiencies, and health and well-being.

Empirically, rural infrastructure investments have demonstrated positive economic and social impacts (Katz and Suter, 2009). Linking isolated areas to a wider market (Hollifield and Donnermeyer, 2003); providing access to opportunities such as healthcare, education, and business (Madden et al., 2000; Stenberg et al., 2009); increasing productivity and participation (Hargittai and Walejko, 2008); and enhancing social capital in regions (Steinfeld et al., 2012) are just a few examples. Akca et al. (2007) list e-trade, GIS for the management of natural resources, public services, knowledge transfers, training and learning opportunities, and promoting tourism as advantages of ICTs for rural communities. However, Andrew and Petkov (2003) caution that technological remedies to problems associated with laying the infrastructure are alone not enough to generate economic growth from the technologies. Telecommunications technologies are necessary, but not sufficient, conditions for rural economic

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