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# **Technology adoption and temporary Indigenous mobility in the Northern Territory**

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# 1. BACKGROUND

Temporary mobility of Indigenous people in remote parts of the Northern Territory is documented as frequent and widespread (for example, Carson, 2011). Temporary mobility incorporates trips away from home where a change of residence is not enacted. Understanding movements to and from small and remote communities is an important task since even small demographic changes may result in rapid, significant and long lasting impacts on service demand (Biddle and Prout, 2009; Taylor, 2012).

Service and infrastructure provision are amongst the main factors thought to influence Indigenous Australians' temporary mobility (Kainz et al., 2012). Obvious examples are transport infrastructure like an airport, which might encourage trips away, or the availability of specialised medical services, which may discourage trips away for treatment. Nevertheless, it is widely recognised that temporary mobility is a complex phenomenon driven by a range of factors including the participation in cultural activities and cultural responsibilities (Memmott et al., 2006). However, the transition of Indigenous cultures from traditional activities towards modernity has given rise to growing recognition there may be other contemporary factors which can explain Indigenous temporary mobility in and around remote Australia (Taylor et al., 2011). For effective service provision it is important to understand what these might be and to assess their relative force in relation to encouraging or discouraging temporary mobility.

On a global scale, labour market factors, access to education, access to services, housing, proximity to friends and family and a better lifestyle are amongst the major drivers of mobility in developed nations. Attempts have indeed been made to determine whether, and to what extent, these are push or pull factors for temporary mobility in the Australian Indigenous context (J. Taylor and Bell, 2004; A. Taylor and Carson, 2009). Nevertheless, very little exists on the role which technology adoption might be playing in encouraging or discouraging temporary mobility. Although studies like those by Hahn and Kibora (2008) in Africa and Taylor (2012) in Australia have postulated that improved Internet access (via better community infrastructure) is likely to increase Indigenous people's temporary mobility, there is little concrete information to assess whether this has been the case.

Using 2011 census data which compares Indigenous people's location on census night to their usual place of residence, we constructed a model to explain who was most likely to be absent from home on census night and the potential drivers. Being absent from home on census night is considered a suitable, although not without limitations, proxy measure of temporary mobility. The model included a range of variables as explanators of mobility. We hypothesised that temporary mobility around communities with relatively greater Internet access would be higher and tested this using 2011 census data. Given that rates of technology adoption are increasing rapidly at remote Indigenous communities (Brady and Dyson, 2009), this analysis empirically tests if and how Indigenous temporary might change from increased adoption.

## 2. METHODS

Data were drawn from the 2011 census (ABS, 2012a). Data used were age, sex, Indigenous status, place of enumeration and place of usual residence and dwelling characteristics (ABS, 2012b). We limited the analysis to 15 'discrete Indigenous communities' in the Northern Territory: Angurugu (Groote Eylandt), Galiwinku (Elcho Island), Gapuwiyak, Gunbalanya, Hermannsburg, Lajamanu, Maningrida, Mililingimbi (Crocodile Islands), Nguiu (Tiwi Islands), Ngukurr, Numbulwar, Umbakumba (Groote Eylandt), Wadeye, Yirrkala and Yuendumu. These 15 communities were priority centres (formerly 'Territory Growth Towns') which were identified as settlements which are expected to 'grow' to play substantial roles in the provision of social and economic services to Indigenous people living in the communities themselves and in the surrounding areas (Carson, 2011).

We used a generalized linear mixed effects model (GLMM) which is a flexible generalisation of ordinary linear regression. GLMMs are widely used to model dependent data, in fields such as applied social research and clinical trials. In demographics, this kind of model can be applied to account for spatial dependence. Because the data we used included multiple observations for each community, there was a danger that these observations were correlated because of similarities of a community. We fitted the model using the *glmer* command which is part of the *lme4* package (Bates et al., 2012) of the statistical software program R (R Development Core Team, 2011). Here the data had a two-level hierarchical structure with 15 262 individuals that were nested in the 15 selected communities. The dependent variable was dichotomous, with the location on census night as being absent from home (1) or being at home (0).

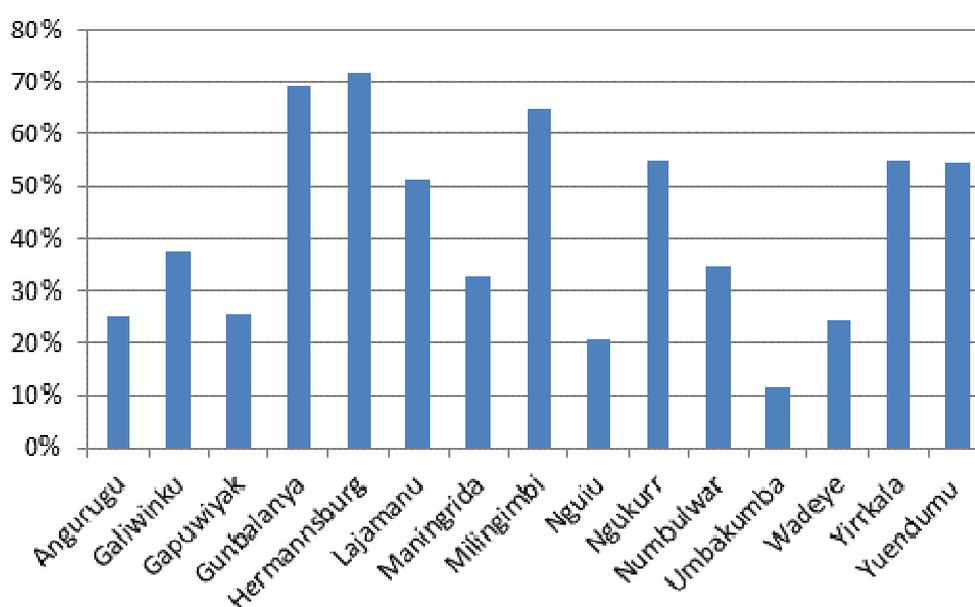
Various explanatory variables were included in the model describing services available at each community and infrastructure including housing, road conditions and levels of household Internet access. The 'Internet' variable in our model included broadband, dial-up and mobile Internet, as captured by the census question on these services (ABS, 2012b). As control factors we also included the age and gender of those who were absent from home on census night.

### 3. RESULTS

#### 3.1. Which communities are best connected?

Across all 15 communities, an average of 45% of dwellings was connected to the Internet. Hermannsburg and Gunbalanya were the best connected communities with about 70% of dwellings having Internet access (Figure 1). Umbakumba (12%), Nguiu (20%), Angurugu, Gapuwiyak and Wadeye (all 25%) were relatively poorly connected communities.

Figure 1: Percentage of dwellings with Internet access, 2011



#### 3.2. Factors explaining temporary mobility

Across the 15 communities, 6.1% of Indigenous people (930 out of 15 262) were absent from home on census night 2011 (for more details see Zander et al., 2012).

##### *Age and gender*

The control factors corroborated results of previous studies which have suggested that young people are more mobile (for example, Bell and Ward, 1998). The odds of being absent from home on census night were 27% higher for women than for men, holding all other factors constant. Children (0-9 years) were one third less likely and teenagers (10-19 years) one third more likely to be absent from home on census night than people of all other age groups. Older people (above 60 years) were only less likely to be absent when they were female; in fact older men were almost three times more likely to be absent than older women.

##### *Technology inclusion*

The model results showed a positive relationship between temporary mobility and Internet access. If Internet access was to be increased from its current rate of 45% of households to 75% of all households, mobility would double from 6.1% (across all communities) to 12.4%. These rates varied in the modelling across the 15 communities. If household Internet access doubled in Maningrida, for example, from 33% (current rate) to 60%, and holding all other factors constant, mobility was forecast to increase by 29%. In

Hermannsburg, a community with relatively high Internet connectivity, increasing the percentage of households with Internet access from 72% to 78% was forecast to increase temporary mobility by 29%.

## 4. IMPLICATIONS FOR THE FUTURE

Our hypothesis was confirmed: Based on the variables modelled here, Internet access encourages mobility. Not only this, mobility is predicted to increase drastically at communities where rates household Internet access is increased. In particular, mobility might be expected to increase in households comprised of young people because they are rapid technology adopters (A. Taylor, 2012). The adoption of mobile phones by the majority of residents at remote Indigenous communities in the NT resembles the phenomenon of technology 'leapfrogging' in Africa (Hahn and Kibora, 2008). High mobility among teenagers might be explained by their use of mobile phones with Internet connectivity to engage with the global world and with family members outside the communities or interstate. Kral (2010) found that using Internet-based technologies for meaningful community projects, such as song-writing, recording music then presenting it on YouTube, can affirm young peoples' contemporary Indigenous identity and their 'belongingness'. This could mean that young people are more engaged in cultural events etc. and that they need to be more mobile. With government plans to expand Internet capabilities across remote Australia (including through the National Broadband Network), rates of household and individual Internet use are likely to climb further and encourage higher rates of mobility.

## 5. CONCLUSIONS

The temporary mobility of Indigenous people at 15 communities (formerly 'Territory Growth Towns') in the Northern Territory was modelled by comparing place of enumeration and usual residence census data for 2011. Mobility continues to be higher for women and young Indigenous people. The application of a generalized linear mixed effects model (GLMM) is suitable to explain other factors than personal characteristics influencing this mobility. We found that temporary mobility is more likely in communities where a higher percentage of households are connected to the Internet. The model suggests that the propensity to be away on census night would double from about 6% to 12% if the percentage of houses with Internet access at the 15 communities increased from the current level of 45%, to 75%.

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