IS INTERNET ON THE RIGHT TRACK? THE DIGITAL DIVIDE, PATH DEPENDENCE, AND THE ROLLOUT OF NZ'S ULTRA-FAST BROADBAND

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SUMMARY HAIKU

New fibre broadband:
Addressing deprivation
In urban areas.

INTRODUCTION

Information technology has the potential to increase economic growth and social well-being, and yet there is widespread concern about a growing digital divide in which digital inequalities exacerbate existing inequalities. The New Zealand government's ultra-fast broadband (UFB) initiative, which began in 2011 and is to be completed by 2022, makes available a new technology through the rollout of fibre broadband which boosts the opportunities of those with access. Conversely, it may hurt those lacking access.

This paper examines the characteristics of the areas that have (or will have) access to UFB and those that do not. We look at how much influence historical decisions have today, by testing whether areas that had the best railway access in the 1880s also have best access to new fibre internet infrastructure. Railway access in those times was affected by remoteness and difficult topography. However, the official Commission that determined rail development in 1880 also deliberately avoided recommending rail to predominantly Māori areas. We are thus examining whether historic infrastructure policies create trajectories that still influence divides today. We also study whether currently thriving or struggling areas are more likely to gain fibre access.

METHODOLOGY

It is important to highlight that we focus on geographical internet access, which is different from an individual or household's decision to take up the opportunity.

We use data on the 46,637 meshblocks in New Zealand, which are small geographic areas with an average of around 100 residents. We web-scraped the National Broadband Map in October 2017 to find whether the centroid of each meshblock had current or future access to fibre, and also current access to cable, VDSL, ADSL, and wireless broadband connections.

To this connectivity data we link historic railway data from the 1880 report of the Railway Commission, which details New Zealand's 1880 railway network. Crucially, it also recommends areas to which railways should be extended, and gives reasons for not recommending railways to other areas. Some areas were avoided because of the terrain or because there were few people living there, while others were avoided because of large concentrations of Māori with whom the colonising Europeans had few economic ties.

We also use demographic data from the 2013 census to record each meshblock's population, population density, deprivation level, and the proportion of the population who are Māori.

In some aspects of the analysis we focus only on urban areas because the source of our railway data captures the 1880 railways status only for towns and cities. We conjecture that it is likely that historical decisions are continuing to have a stronger impact in more rural areas.

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ULTRAFAST BROADBAND INITIATIVE AND HISTORIC INFRASTRUCTURE PLANNING

The New Zealand government's ultrafast broadband (UFB) initiative was announced in 2009 as a NZ$1.35 billion package (0.7 percent of annual GDP) to give 75 percent of the population access to fibre broadband by 2019. The goal was to improve the connectivity of businesses, schools, hospitals, and households; fibre broadband was rare prior to the government rollout, and the main alternative connections are slower. The fibre rollout was expanded in August 2017 with a new target of 87 percent coverage by 2022. In conjunction, the Rural Broadband Initiative was announced as a $300 million package of new and upgraded cell towers, to improve 3G and 4G wireless technology in rural areas missing out on UFB.

In general, areas that are not scheduled to gain UFB access tend to be rural with low population density. The urban meshblocks that miss out also tend to have low population density and are often located on the edge of a town or city.

From the 1870s, railways opened up areas of New Zealand for settlement and carried products from farms, forests, and mines to coastal ports. Because railways were built principally to connect European settlers, areas with mainly Māori inhabitants were often avoided (see the 1880 New Zealand Railway Commission for explicit recommendations to avoid building railways to predominantly Māori areas). Areas were also avoided due to difficult terrain or remoteness.

In this paper, we ask three questions on the links between the historic rail and current UFB infrastructure (a long-term relationship known as 'path dependence'). First, are the areas gaining access to UFB also the areas that gained access to railways in the 19th century? Second, are the areas that lacked 19th century rail due to remoteness or terrain also now lacking UFB access? Third, is there an ethnicity gap in access to UFB, given that New Zealand's early railway infrastructure deliberately avoided predominantly Māori areas?

TOPOGRAPHY

People in areas lacking 1880s railway because of terrain or remoteness currently have worse fibre and fast broadband access than people in areas that had 1880 railways access (40 percent vs 66 percent). However, this disparity largely disappears when taking future access into account because the updated UFB rollout will reach many of these people in the coming years. Thus, based on terrain, there has been a divide in priority of access, but not in long-term access to fibre and/or fast broadband. These data are for urban areas only, and path dependencies due to terrain or remoteness related to railway infrastructure are likely to be stronger in rural population centres and rural areas.

ETHNICITY

People in areas that were historically avoided for railways because of Māori settlement are almost identical in terms of UFB access to those that had an 1880 railway, suggesting that historic discrimination in infrastructure access has not

1] The RBI was also extended in August 2017, and received $290 million along with the new Mobile Black Spot Fund. The latter programme will improve mobile access for highways and tourist zones.

translated into current disparity in internet access. Furthermore, urban areas that lacked 1880 railways due to a higher concentration of the Māori population are more likely to have prioritised access to UFB (75 percent versus 66 percent).

On the other hand, Māori are slightly less likely than other New Zealanders to get fibre access due to the rollout. This is despite the fact that within urban areas (cities and medium-sized towns), Māori are more likely to benefit. This paradox arises because main urban areas, which have the best fibre access, have the lowest proportion of Māori residents. Hence, overall, Māori are slightly less likely to have fibre access.

DEPRIVATION

Our analysis of the digital divide with respect to deprivation suggests that it is the more deprived areas that tend to have better access to current or planned fibre. This result holds countrywide, where a standard deviation increase in deprivation is associated with an 8 percentage point increase in the probability of having current or future fibre access.

The result also holds separately for urban and broader-rural area types (though is not statistically significant in broader-rural meshblocks), and holds when we control for each of the 143 urban areas in which New Zealand's meshblocks fall. Thus the rollout has decreased rather than exacerbated the prior digital divide by area deprivation. The positive association disappears when controlling for population density, suggesting that the digital divide has decreased because internet access comes first to denser areas, and denser areas tend to be more deprived.

CONCLUSION

Our analysis shows that there is a digital divide in UFB access between more and less remote areas. Relatedly, we also find a slight divide in access by ethnicity. Nevertheless, New Zealand's fibre rollout has positively addressed potential divides based both on material deprivation and – within urban areas – on ethnicity.

Although the data provide an optimistic picture of the UFB rollout for those concerned with digital divides in access, the analysis does not look at a household's ability or choice to take advantage of this new infrastructure. More disadvantaged households may be less likely to take up the opportunity to connect to the fibre broadband available in their area, and this is a field that warrants further study.

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