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Investment in digital infrastructure: Why and for whom?

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Abstract. This study investigates the variation in attitudes across stakeholders towards investments in the digital economy. Using semi-structured interviews to identify attitudes about the spatially evolving socioeconomic importance of the digital economy in New Zealand, we identified seven distinct yet partially overlapping concerns that prioritise preferences for digital investment. A key finding is that there are important asymmetries in stakeholders' narratives and epistemological foundations that currently align to collectively strengthen resolve to invest in digital infrastructure and training, but this alignment may splinter in future. Some stakeholders saw internet access as coalescing social economy, and there were concerns that some people and some places would get left behind if access is not rolled out uniformly and as a priority. There were disagreements about who will prosper, who will get left behind, who should pay for upgrading digital skills, the extent that investments were connected with wellbeing and identity, whether fake news was significant, and the longevity of the impact of digital economy investments. This study contributes to theory by demonstrating that practically-relevant, socially-informed policy decisions can be underpinned by collective efforts that draw on heterogeneous narratives and multidimensional understandings.

JEL classification: D83; L86; L96; O18; R58

Key words: Internet, Infrastructure, Wellbeing, Left behind, Places, People, Epistemology

1 Introduction

Policymakers residing over different jurisdictions gather and share knowledge, experience, and policy insights with fellow policymakers, stakeholders, and academics to try to augment the influence and impact of their policies. Policymakers' own experiences and current contexts influence their understandings of the strength and effect of available policy options. In some cases, contrasting stakeholder pressures create inertia in the system reducing the likelihood of achieving agreement across the political spectrum. In other cases, conflicting epistemological foundations can coalesce to steamroll the development process, which is the case when stakeholders, academics, and policymakers agree on a policy outcome but for disparate reasons.

The digital economy (DE) represents the convergence of computing, fixed and mobile telecommunications, commerce, and entertainment (Tapscott 1994); the architecture of the DE includes applications, platforms, and infrastructures (Hanseth, Lyytinen 2016). New DE business models have created enormous wealth, concentrated in a small number of countries, companies, and individuals. Countries face policy challenges to realise the potential of the DE such that the benefits are realised by many and not just the few.

The purpose of this paper is to assess the extent to which DE development policies are underpinned by diverse understandings of the costs and benefits of DE investments. This is important because if influential stakeholders, academics, and/or policymakers begin to perceive that the net benefits of DE investments are waning, then inertia may set in and potentially enhance the spatial inequalities in online accessibility.

The aim of this research is to understand the different narratives underpinning DE policy. We created a semi-structured interview schedule centred around DE issues relating to engagement, wellbeing, and opportunities in an attempt to uncover perceptions, processes, needs, and priorities associated with DE investment policies. We then interviewed a structured sample of key informed stakeholders, academics, and policymakers across New Zealand. New Zealand is a particularly interesting and relevant case study as their government is leading the world by altering their budgetary focus to strive to ensure a holistic approach to wellbeing and wealth, with some policy initiatives focusing on the DE.

We identified seven distinct though partially overlapping concerns relating to the socioeconomic importance of investments. The analysis reveals distinct differences in epistemology underpinning attitudes and perceptions towards the DE. This study contributes to understanding by demonstrating that policy decisions can be underpinned by collective efforts that draw on heterogeneous narratives and multidimensional understandings, but it also warns of potential future challenges to DE investment policies when attitudes wane.

This paper is structured as follows. Section 2 reviews the literature on the importance of narrative, attitudes, pressure groups, and other stakeholders in the formation of resource allocation policies and highlights existing gaps in this literature. Section 3 presents the research methodology. Section 4 presents the identified themes and synthesises the findings. Section 5 discusses these results and draws conclusions.

2 Literature review

Shiller's seminal contribution (Shiller 2017) contends that discursive narratives, factual or otherwise, effect the occurrence, spreading, and possible control of all aspects of the economy. Shiller argues that spoken and written accounts instinctively and subliminally stir emotions and motivate human actions that affect effort levels, spending patterns, and investments, and thereby shape the evolution of the economy. It is plausible therefore that the presence and evolution of DE policies can be influenced by diverse narratives underpinned by epistemologically informed beliefs and priorities. Contrasting narratives may strengthen the ideological divide between policymakers, stakeholders, and academics, and make majority agreements over policy formation a matter of pragmatism. Given these complex issues, it is surprising when a diverse set of policymakers, stakeholders, and academics agree on the importance of a policy, as appears to be the case for policies relating to DE investments.

2.1 Consensus

The usual stance for advocating the development of the DE is grounded on the assertion that the internet provides superior access to information, greater opportunities to share information, and greater access to a more diverse set of goods, services, and markets. Economic growth then results from increases in productivity, jobs, and firm births (Duvivier et al. 2021, Canzian et al. 2019, Vial 2019). The internet augments social contact and access to healthcare and education, thereby supporting wellbeing (Early, Hernandez 2021, Benda et al. 2020) and strengthening the fabric of society.

The literature tends to view the advocation of DE investments as unquestionable with the proviso that alongside ICT infrastructural investments come investments in digital skills training that enables individuals and firms to benefit. Broadband provision and digital skills are not equally distributed within or between countries leading to a range of digital divides. Three digital divides are identified in the literature (Aissaoui 2021). The first is the access divide between those who do and do not have access to the internet. The second is the use divide between those who do and do not have the digital skills and knowledge to use ICTs. The third level is the performance divide between those who can and cannot mobilise digital resources to achieve their aims and gain offline outcomes (Aissaoui 2021). While much of the digital divide literature focuses on the second and third levels, the first divide persists; for example, 21 million people lack broadband access in the US (Rodriguez, Bates 2020). Support for DE investments is called for across the literature even through arguments explaining why it is needed are heterogenous.

2.2 Economy vs. people

From an economic growth perspective, it is argued that DE investments support an entrepreneurial environment (Gorelova et al. 2021, Tiwasing 2021), encourage firm births (Conroy, Low 2022), and stimulate entrepreneurial behaviours by lowering barriers to entry and creating new markets (Duvivier et al. 2021, Mei, Lu 2020). Early adoption of ICT infrastructures benefit a locality by attracting knowledge intensive firms (Tranos, Mack 2016) that increase the productivity and profitability of resident firms (Kharlamov, Parry 2021, Canzian et al. 2019, Vial 2019). Digitally connected firms benefit from access to online business networks (Tiwasing 2021) and a greater range of suppliers with improved knowledge sharing (Gallardo et al. 2021, Leuven et al. 2018). Access to the internet therefore supports firm growth, innovation, reputation, and competitive advantage (Vial 2019) whereas digital exclusion negatively affects productivity (Gallardo et al. 2021). Firms are known to benefit from engaging in social media due to the growth effects of greater direct connections with customers (Aronica et al. 2021, Tiwasing 2021) that can improve services and enhance operations (Vial 2019), and engender a positive impact on brand equity (Godey et al. 2016). Hence, there is a strong collection of stakeholders, policymakers, and academics who favour the upgrading of the digital infrastructure for reasons relating to the benefits to firms.

An alternative focus is on the benefits to individuals where there tends to be a different set of arguments favouring ICT infrastructure investments. Access to the internet provides individuals with an advantage in finding a job (Denzer et al. 2021, Metu et al. 2020), enabling online searching, access to information on jobs over a wider geographical area, increasing the number of job applications an individual can make, and providing greater access to networks through which they can promote their skills and availability (Denzer et al. 2021, Gürtzgen et al. 2021). For individual consumers, e-commerce can lower prices, reduce travel costs, increase choice, and save time (Ganning, Green 2021, de la Llave Montiel, López 2020, Dolfen et al. 2019, Goldfarb, Tucker 2019).

2.3 Urban vs. rural

The internet can enable and enhance interactions locally and over large geographical distances (Elmassah, Hassanein 2022, Kearns, Whitley 2019, Oh et al. 2014, Ellison et al. 2007), but the benefits to individuals and firms are not aspatial. Spatial disparities exist in the benefits of online retail, with shoppers in high-income countries benefiting most and with the cost of delivery sometimes being prohibitively expensive for remote dwellers in low-income countries (Ganning, Green 2021). This makes the claim for digital infrastructure investments to reduce spatial disparities problematic and contentious.

Remote and rural areas are underserved and have poorer quality connections to the internet (Aissaoui 2021, Riddlesden, Singleton 2014, Tranos, Mack 2016). For example, in the US, less than half of indigenous people residing on reservations and tribal lands have access to high speed broadband due to providers' reluctance to build ICT infrastructure in less populated areas (Early, Hernandez 2021). Bosworth et al. (2020) argue that a spatially uneven ICT infrastructure leads to inequalities in digital skills and an inability

to attract digitally skilled workers or firms to rural areas. They also advocate for a 'smart' countryside and argue that the lack of development of ICT infrastructure in rural areas affects their supply chain and labour market connections to urban areas with whom they are interdependent. Conroy, Low (2022) also emphasise the importance of internet access in rural areas to sustain remote communities, particularly the entrepreneurial activities of women who are more likely to work from home. SMEs and entrepreneurs require access to digital literacy programmes, online business support, high speed broadband access, and the creation of online co-working spaces (Conroy, Low 2022, Tiwasing 2021) that are more readily available in urban areas. Such arguments heighten the need to be spatially-aware when installing an online infrastructure.

However, evidence on the benefits of broadband access to rural entrepreneurialism is mixed. Couture et al. (2021) find that the expansion of broadband and access to e-commerce in rural areas does not lead to income gains for local workers per se, but rather for younger richer rural residents in the form of a lower cost of living. Duvivier et al. (2021, p. 1397) find positive effects of broadband on establishment births in urban and suburban areas but little evidence of an impact on rural areas other than for specific industries (tourism, creative, and business services): 'broadband is clearly not a panacea and certainly not sufficient for creating a good entrepreneurial context in structurally weak areas. As such, focusing exclusively on improving broadband access is likely to generate little impact on local economic development in most areas.' From an economic development perspective therefore, it is possible to see how support for rural ICT infrastructure investments may weaken, particularly when policy is directed towards cities with larger benefiting populations (Rodríguez-Pose 2018). Support for investments in infrastructure is likely to wane if policies do not account for spatial changes in business ecosystems due to digitization and globalisation, or if they do not also address future challenges of climate change, aging, social inclusion, and health (Tödtling, Trippl 2018).

2.4 Health, education, wellbeing, and/or identity

Those advocating for DE investments to enhance individual and community wellbeing argue that the benefits are derived through greater access to healthcare, social networks, and education. Access to the internet has been argued to be both a social determinant of health (Benda et al. 2020) and a basic need that is necessary to thrive in the digitally dependent world (Early, Hernandez 2021). Digital healthcare provides patients with more access and control of their medical records (Rodriguez, Bates 2020), supports older people living the community (Hamblin 2020), and reduces the burden for care givers (Kim et al. 2021). Covid-19 highlighted that the internet provides crucial access to information and advice, online consultations, and services. The shift to digital gives healthcare providers the capability to deliver more efficient and effective care, particularly to those living in remote areas (Kim et al. 2021, Gann 2019, Srivastava, Shainesh 2015).

However, the digital divide is known to lead to uneven health outcomes. Racial and ethnic minorities, low socio-economic groups, the elderly, and rural populations suffer the worst healthcare outcomes and are also those affected most by the digital divide (Hadeler et al. 2021, Kim et al. 2021, Gann 2019). Early, Hernandez (2021) argue that Covid-19 widened the digital divide and amplified systemic racism in the US, where people from Black and Hispanic backgrounds were found to have lower rates of digital access (Dolcini et al. 2021). Black and Hispanic adults were twice as likely as White adults to cancel internet subscriptions due to financial constraints (Vogels et al. 2020) and a lack of broadband access may contribute to lower vaccination rates among these groups (O'Brien 2021). Equitable digital healthcare requires increases in broadband access alongside culturally sensitive digital health tools, greater access to interpreters, and digital training (Hadeler et al. 2021), which strengthens the case for greater access to online facilities from a health perspective. However, Hamblin (2020, p. 120) highlights the lack of clarity over the potential for digital healthcare devices in practice, noting the risks of a pro-innovation culture within local authorities that support small scale pilots with little focus on sustainability, scale, or spread: 'it ... remains unclear if these devices can deliver the outcomes required in diverse local [adult social care] contexts with different demands and policy legacies.'

Covid-19 underscored the essential role that the internet can play in providing access to education, leading to widespread discussion linking the digital divide to pre-existing socio-economic gaps in educational achievement (Benda et al. 2020). It is possible that the return to in-person teaching may lessen calls for DE improvements for education, or for the digital divides faced by children to be addressed, particularly as other issues, such as the cost of living, take to the fore. Children are not naturally well equiped for their digital futures and need to be educated and empowered to shape and utilise future digital technology (Iivari et al. 2020, Binsfeld et al. 2017) requiring a shift in curriculum emphasis and further ICT training for teachers before interventions become effective. If the digital education attainment and skills of the next generation is to drive future development, then investments in ICT infrastructures, and the facilitation of access so that marginalised groups can participate in the DE, remain key for future prosperity.

Akerlof, Kranton (2010) argue that people make behavioural choices based on both monetary incentives and their identity. The nurturing of one's identity and relative performance is known to be important for an individual's subjective wellbeing (Stutzer 2004, Frey et al. 2008) and engagement in social media can increase the visibility of an individual's identity. Douglas, Isherwood (1979) saw identity as both intra-individual (i.e. psychology) and inter-individual (i.e. social), so ensuring that everyone is able to participate in social media by guaranteeing them access to participate in the DE may reduce feelings of social exclusion.

Extending internet access to deprived communities can improve social isolation and mental health (Gann 2019, Kearns, Whitley 2019). However, the positive impacts of the internet on mental health are questionable, as disengagement from social media can increase socialisation with family and friends and increase subjective wellbeing (Allcott et al. 2020). Moreover, girls in particular are at risk of experiencing poor mental health and poor wellbeing due to social media effects (Hartas 2021), although Beeres et al. (2021) suggest that high levels of social media usage may be an indicator rather than a risk factor in mental health. Among older adults, engagement in social media is found to have only marginal impacts on social connection (Quinn 2021).

2.5 Consensus, but devil in the detail

Although existing literature tends to view the advocation of DE investment as unquestionable, there are emerging grounds on which to reassess the perceived net benefits and hence the prioritisation of ICT investments, especially at a time when resources are squeezed during the recovery from the pandemic. Increasing debate about the magnitude of benefits from online access highlights the need to dissect the above arguments and delve deeper to identify the reasons for different influential parties' support for DE investments. If the strength of argument from an influential body advocating further DE investments begins to wane and begins to stress alternative policies, then the prioritisation of further DE investments will be questioned. Moreover, although cost-benefit analyses are often used to justify the prioritisation of resource allocations, each cost and benefit will attract different weightings depending on the underlying epistemological stance. A debate therefore arises on whether the strength of the ICT infrastructure and DE investment narrative is weakening.

To identify the intensity of support for further DE investments it is necessary to explore the strength of narratives relating to their costs and benefits. To fill this gap in the literature we need to know whether policymakers, stakeholders, and academics all agree on who benefits from digital investments, how they benefit, why they benefit, why they should benefit now rather than later, and whether investments should continue to remain a priority. This research sought to understand the narrative and epistemological stance of a variety of stakeholders, policymakers, and academics, which is important given Shiller's contention (Shiller 2017) that discursive narratives, factual or otherwise, effect the occurrence, spreading, and possible control of economic fluctuations. As narrative motivates spending patterns and investments that shape the evolution of the economy, it is important to recognise and understand what underpins DE policy narratives and whether those narratives are weakening. As a narrative is unlikely to be accepted if it is deemed to be implausible, lack credibility, or lack competence from an onlooker's perspective (Govier

1980), a policy narrative will weaken when the strength of a perspective wanes. Hence, our research sought to understand the foundations of different narratives concerning if and why DE investments are a priority, gage the extent that each perspective is likely to continue to have credence, and assess whether there are likely to be emerging gaps in the narrative supporting the continued development of ICT infrastructure.

3 Research approach

This research investigated knowledge and attitudes towards ICT infrastructure and the digital economy within and across New Zealand, which is a high-income country that explicitly prioritises wellbeing in its annual Budget. The research sought to increase understanding of the successes, visions, challenges, and apprehensions of investing in DE through interviews with policymakers, stakeholders, and academics. Interviews were considered to be more appropriate than questionnaires given that questionnaires are less able to capture complexities such as the inter-relationships, relative weightings, and the cumulative influence of factors (Lightbody 2009).

A detailed semi-structured interview schedule was developed to ensure that a full range of expected issues were included in the discussion while also ensuring space and flexibility for deeper discussion of both expected and unexpected issues if and when interviewees wished to go in those directions. Given NZ's Budget focus on wellbeing, we started the semi-structured interview with questions relating to if and how DE investments were aligned to growth and wellbeing issues, and then discussed whether DE investments were likely to benefit growth more than wellbeing. The semi-structured interview schedule then proceeded to discuss whether DE investments were geared towards reducing the rural-urban divide and whether they improved the wellbeing of remote communities or affected people's level of loneliness. The schedule then moved towards a discussion of the sectors that are likely to benefit most. Finally, the schedule proceeded to discuss ambitions for the future of DE and to identify what the future may hold for different parts of NZ's social economy.

The sample of interviewees was developed initially from contacts, and those contacts introduced new contacts using a snowball sampling approach. An important consideration was that a wide and diverse range of representatives from policy-focused and pressure group organisations should be included to ensure a broad range of contending perspectives and to draw on a contrasting range of experiences and expertise. Gilbert (2005, p. 61) argues that 'where the researcher's aim is to generate theory, a wider understanding of social processes or social actions, the representativeness of the sample may be less important, and the best sampling strategy is often focused or judgemental sampling.' Ensuring that the sample was broad and heterogeneous should enable the identification of both consistent and contrasting attitudes towards the DE infrastructure and the digital economy more generally.

Informed policymakers, academics, and respected intermediaries were approached through existing contacts; a sample of ten senior policymakers, stakeholders, and academics agreed to participate in detailed semi-structured interviews that were expected to last for between 40 minutes and one hour. In practice, however, the semi-structured interviews lasted for an average of 80 minutes and ranged from between 40 minutes to $2\frac{1}{2}$ hours depending on both the enthusiasm of the interviewee to engage with the topic with the researcher and their time available for this engagement. Interviewees were assured of their anonymity and encouraged to discuss their own views that may not necessarily align with the public messaging from the organisation that they worked for. Although the number of interviews appears small, and the primary data collection was undertaken in November and December 2019 prior to the outbreak of the Covid-19 pandemic, the remarkable depth of information shared in the process aligns with the guiding principle to achieve naturalistic generalisation (rather than statistical significance). This naturalistic generalisation relies on the researcher's understanding of the interviewees' tacit knowledge present about "how things are, why they are, how people feel about them, and how these things are likely to be later on or in other places with which the person is familiar" (Stake 2000, p. 22).

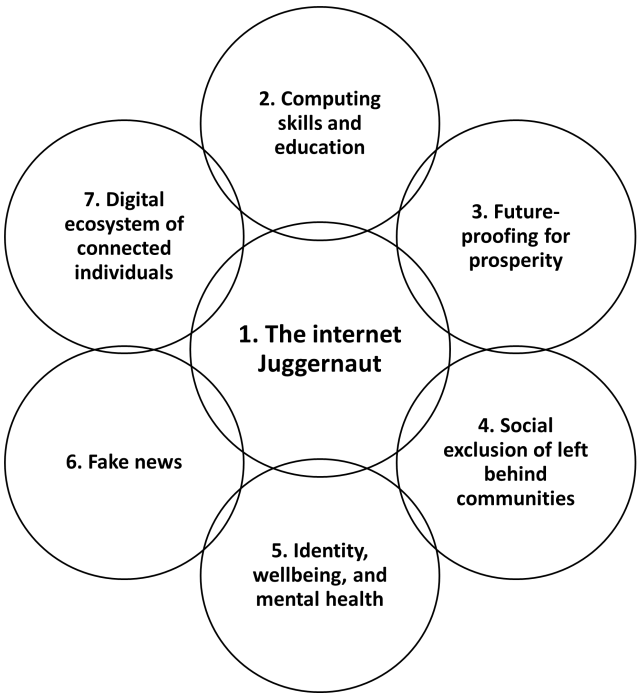

Figure 1: The internet Juggernaut and associated concerns

We suggest therefore that the size of the sample is sufficient given the small size of the possible population of policymakers, stakeholders, and academics, the aims of the study, the quality and depth of the dialogue, and the analytical thematic strategy. The interviewer also observed that the sample was tending towards saturation. Given these strengths, it is likely that the sample of interviewees provided information with a very high level of validity and reliability, with good potential for generalisable inferences out of the immediate context.

4 Findings and policy recommendations

Content analysis of the information sourced through the semi-structured interviews reveals seven distinct partially overlapping themes concerning the socioeconomic importance of ICT infrastructure and the DE, as shown in Figure 1. The analysis also reveals distinct differences in epistemological foundations underpinning these themes.

4.1 The internet Juggernaut

The DE was understood as a juggernaut; all of the interviewees recognised the sizable benefits of climbing aboard, ensuring that they are not left behind, reaping the rewards from early engagement, and dispersing the benefits to the wider community. There were universally positive views about the benefits of the internet for society; for instance, there was evidence consistent with Early, Hernandez (2021) that it provides opportunities for members of society to engage with each other, and perspectives consistent with Gallardo et al. (2021) that any policies or initiatives that inhibited its growth and development within their economy would either be detrimental for socioeconomic development of their economy or, more likely, impotent, and futile. There was almost universal agreement that policies should be prioritised and focused on facilitating the development of the online economy so that they did not slip behind their international competitors. Part of the reason for this stance was the belief that a stronger ICT infrastructure would permit, facilitate and even stimulate prosperity and regeneration through closer virtual connections, which is consistent with the findings of Canzian et al. (2019), Duvivier et al. (2021), and Vial (2019).

Interviewees perceived businesses that engage with the DE tend to be illustrious and a have many customers, whereas businesses that do not engage with the DE will progressively lose market share and revenues that in turn reduce their ability to invest and be competitive in the long run. This part of the collective narrative is consistent with the emphasis of Vial (2019) on the importance of internet access for firm growth, innovation, reputation, and competitiveness. The interviewees saw three main reasons for business managers to avoid engagement with DE: i) a perception that the benefits from engagement were less than the costs (in time and/or money), ii) engagement was perceived to be too complicated and beyond the abilities and/or interests of managers, and/or iii) a belief that targeted consumers were influenced more by personal contacts and customer service than online engagements. Note that this narrative about not engaging with the DE is not strictly about a firm's online growth and is instead about organisational sustainability and the satisficing principle, managerial confidence in their own abilities, and having informed knowledge about their customers. There was also a belief that some reticent managers only engaged with the online world as a defensive mechanism to avoid losing customers as opposed to gaining new customers. There was the general perception that firms engaging with the DE were more interested in going for growth, whereas firms not engaging were more interested in managerial satisficing and organisational sustainability. Participation in the DE may therefore be an indicator of ambition and drive for growth with online engagement partly fulfilling those ambitions, rather than the DE being a panacea or a mechanistic relationship whereby online engagement creates growth. Comprehending the breadth and importance of managerial objectives may be key to successful growth enhancing DE-related policies.

Interviewees emphasised that policymakers are observing what each other does to help keep businesses within their jurisdictions at the frontier of digital engagement. There is the need for policymakers to be informed of potential obstacles in the development of the DE that may currently or in the future limit the benefits from engaging with the DE. These blockages include a range of issues and vary from the slow rolling out of 5G and superfast fibre broadband to facilitating meetings that encourage greater and deeper business and consumer engagement with the DE, yet the unblocking of these paths may be more easily achieved in urban rather than rural areas.

Limited discussion took place about the detrimental effects on a local economy of purchasing products online from a shopfront elsewhere. The discursive narrative of the effects being net-positive was so clear that there was little explicit recognition of the possibility that increased online purchases could lead to fewer local purchases, reduced local spending, and less derived demand for local workers. When much greater proportions of purchases are conducted online, as has been stimulated by the pandemic, the long-term effect is likely to be at least a restructuring of local economies towards more locally-embedded experiential goods and services, though some areas may well experience an effect that sways the narrative away from greater online engagement.

The spatial spread of the benefits of engagement with the DE were briefly discussed. Although there was a clear perception that the absolute quantity of benefits would be greater in urban areas, there was also recognition of the many benefits for firms located in rural areas participating in the DE, especially due to overnight delivery of purchases. There was an understanding that rural firms not engaged with the DE were missing the opportunity to sell their goods to consumers in urban areas, and that a lack of economies of scale could limit the growth of rural firms and hence limit the derived demand for local workers. Enhancing ICT infrastructure in rural areas may be only half the battle in raising rural productivity, as managerial objectives would also need to be steered towards more ambitious growth plans.

Policymakers could increase the visibility of discussions and initiatives concerning the benefits for local firms engaging with the DE. Although it may be necessary for local government to second-guess managerial motivations for running firms (maintain market share, ensure sustainability, high growth, etc.), there was emphasis on the need to run local meetings in urban and rural areas that inform managers of the whats, whys, and hows of digital engagement. These can prove beneficial not only to enlighten and convince the managers of the benefits of online engagement but also to provide clear details of how

to engage. Education concerning the benefits and ease of digital engagement was seen as key.

4.2 Computing skills and education

Internet and computing skills were considered core proficiencies for engagement in the DE and necessary both for effective engagement with the rest of the world and for prosperity, welfare, and wellbeing. This is consistent with the emphasis of Aissaoui (2021) on digital divides and particularly the dimension concerning the inability to use the internet. But it is also necessary for ICT infrastructure to be in place as a lack of internet accessibility reduces the ability to hone digital skills and would be a barrier to the relocation of firms to the area (Bosworth et al. 2020). Interviewees stressed the need for the education of basic computing and internet skills to start from a very young age and enable children to learn further skills as they grow into the DE. Schools need to be alert to children who do not appear to be developing those skills and there should be fun, enjoyable, and engaging extracurricular activities provided both by schools and local community groups that develop those skills and ensure that their inhabitants are not left behind.

Interviewees emphasised the importance of benevolent members of communities that are highly skilled in internet and computing skills to step up and run community classes that facilitate the inter-personal transfer of these skills. Community-led lessons already exist that teach programming, coding, robotics, trading, and website design; however, these classes tend to be organised and run by knowledgeable and experienced digitally engaged users in the community who want to ensure that the next generation are ready for the evolving DE. This reliance on community-minded local residents to provide digital education exposes the importance of the role for the community and heightens the recognition that communities without these benevolent individuals risk being left behind. Those communities with more digitally engaged benevolent users are likely to be at an advantage in providing these services, whereas those communities with few if any digitally engaged users, typically due to their own labour market backgrounds, are likely to be increasingly left behind. Payments to providers for extra-curricular digital education was known to be low if it existent at all, and hence there is the need to identify whether such benevolent service providers exist everywhere.

Although it was deemed to be fully appropriate that these benevolent individuals are able to undertake altruistic activities, it is questionable whether local communities should expect those individuals to also possess the skills and the facilities to organise and advertise the sessions. Their efforts and enthusiasm can be stifled by red tape, administrative barriers, and a lack of community facilities. Local communities and government need to ensure that these activities are supported and prioritised so that digital initiatives created by community-minded initiatives are established for the public good. One option is to have 'Community Enablers' who open doors, facilitate and arrange activities, identify solutions to encountered problems, and encourage greater engagement by community-minded members of the public who have the skills, knowledge, and experience that are worth sharing in the wider community. If the local narrative is not strong enough to stir emotions and motivate community-minded digital education provision, then the local economy may be left behind.

4.3 Futureproofing for prosperity

There was the view that government should ensure that the economy is futureproof and take a paternalistic role to ensure inclusivity rather than let market forces dominate the supply of internet access and potentially limit future prosperity. Interviewees recognised that the roll-out of ICT infrastructure requires a significant amount of financial resources, and that this will only be undertaken by private sector companies where there were clear profits and revenue streams to be made from expanding the size of the digital network. The financial incentives to route fibre optic cables to sparsely populated difficult to access locations will be small, reducing the incentive to connect those areas. This is consistent with the findings of Aissaoui (2021), Riddlesden, Singleton (2014), and Tranos, Mack

(2016) who stress that remote and rural areas are underserved and have poorer quality connections.

The interviewees did appear to appreciate the argument of Bosworth et al. (2020) that a spatially uneven ICT infrastructure leads to inequalities in digital skills and an inability to attract digitally skilled workers or firms to rural areas. If the effects of providing access to better quality internet access are not simply one-off but are dynamic, this implies that there are cumulative negative effects of postponing DE expenditure, which further widen the digital divide. Investments often require the calculation of net present value estimates to identify whether and where to allocate resources, but the failure to invest in appropriate digital infrastructure now will affect the competitiveness of a local economy in the future and may put a local economy on the path to greater dependency for extra government resources further down the line.

4.4 Social exclusion of left behind communities

There were concerns that sections of society would be left behind and not accrue the benefits from engagement with the DE. Several reasons were behind this concern, including the lack of availability of ICT infrastructure in some geographical areas, a lack of people's knowledge and ability to engage, a lack of perceived benefit from engagement, the presence of social and/or cultural expectations to abstain from using the internet, and a lack of digital experiences that are of interest to sections of society. These issues encompass a range of socioeconomic behaviours and spatial considerations, some of which are more easily amenable to policy interventions.

Early provision of ICT infrastructure provides local inhabitants with an advantage, but late provision of that infrastructure can often disadvantage or stigmatise local inhabitants and reduce their likelihood of engagement with the DE. Early provision of ICT services can make a disadvantaged community feel lucky and special, and this could stimulate them to take advantage of these services and enable them to grow out of their left behind state. Part of some interviewees' narrative for ICT infrastructure investments is illustrated in Figure 2, where a lower perception of the personal, economic, or social benefits of engaging with the DE, such as the perception that doing so is mainly for "internet geeks", can make some individuals opt out and identify themselves with other groups within a community; identity is key (Akerlof, Kranton 2010, Douglas, Isherwood 1979).

Low levels of connection to all things digital can peripheralize parts of the population and reduce their ability to access information and services, such as when local government notices and forms are only provided through the internet. This disconnection can alienate residents and increase their loneliness, leading to a deterioration in their mental health and wellbeing (Stutzer 2004, Frey et al. 2008). This cumulative circular effect can become a negative spiral when there are social and/or cultural expectations not to engage with the internet, or when the expectation that those who do engage with the digital economy are from a different group within society, such as when retirees assume that the DE is mainly for youths and big business. Intersectionalities occur in this area, and can cut across ethnicity, gender, age, culture, race, and incomes, etc.

4.5 Identity and mental health

A major view expressed by interviewees was that people unquestionably gain social and economic benefit from connecting to the internet, which is consistent with the ideas of Gann (2019) and Kearns, Whitley (2019). The social and personal costs of engaging with the internet, such as a potential detrimental effect on mental health, were played down, and the narrative was overwhelmingly positive. When issues such as mental health were discussed, there was a tendency to highlight the benefits to mental health rather than consider the costs. Greater and faster internet access was seen to be an instrumental way of giving people opportunities to express themselves and to connect to their families, wider communities, and/or social groups. Digital connectivity was viewed as a way to enable people to develop and strengthen their identity even though this is contrary to Quinn's findings that engagement by older adults in social media only has marginal impacts on social connection (Quinn 2021).

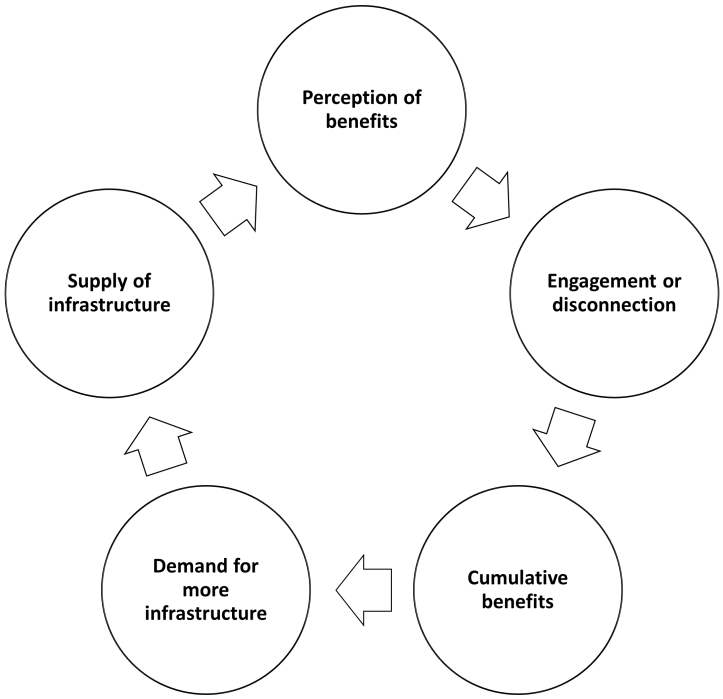

Figure 2: An engagement cycle in the digital economy

One downside of the spatial variation in access to the internet was that there are portions of society that are unable to nurture their identity in this way. Some interviewees recognised that policymakers need to be aware of individuals' needs to nurture their identity through the internet should they wish to do so, and that failure to do so may leave them feeling excluded and potentially lonely. Faster and stronger interpersonal connections through social media can boost social linkages, enhance people's feelings of belonging, and strengthen the fabric of society, thereby improving people's wellbeing. Areas that have poor or variable quality internet connections will not benefit from this aspect of the DE as much. Alternative ways of connecting people in inaccessible rural areas are needed to ensure that topography does not adversely affect the ability of certain groups of our society from engaging successfully with each other, such as is the case with the spatially dispersed farming community that typically have a strong sense of community. Given the sometimes lonely day-to-day duties of farm workers, it is perhaps even more important to ensure that these individuals are able to seamlessly connect with each other and with other sections of society in the same way that people are able to in urban areas.

There was a brief mention of the consequences of over-engagement and over-reliance on the internet as an outlet for self-expression, which was viewed as having potential addictive habits that adversely impact on an individual's other duties and roles within society. This is consistent with the observation by Hartas (2021) that girls are at risk of experiencing poor mental health and poor wellbeing due to social media effects. Negative experiences on social media, such as trolling with inflammatory posts, can be very upsetting and cause individuals to disconnect from online social media and from their wider social group.

Two main solutions were discussed by a select few interviewees and which both have different spatial dimensions. On the one hand, negative effects on social wellbeing on digital engagements were seen as a national if not a global problem, and if engagement with online social media required participants to sign up using their passport or driving licence, then any need for reprisals due to online bullying or other socially unacceptable behaviour could be targeted efficiently. On the other hand, victims of internet trolls may require local counselling and those who over-indulge in online services may require local support sessions similar to the services provided by Alcoholic Anonymous. Excessive

under- and over-engagement with the digital economy were viewed as being relatively small scale but real problems that policymakers need to include in their policy toolbox and providing these community services may be more cost effective in urban rather than rural areas. Nevertheless, the costs of disengagement, exacerbated effects of loneliness, and other negative effects of the DE were recognised as being under-identified. The respective interviewees did not provide an indication of who should pay for these support services, whether it is the sufferer or a public body, and this part of the narrative was under-developed. If greater awareness of these issues is developed through the media and identified as a growing concern, then greater awareness of these costs may influence the digital infrastructure policy narrative.

4.6 Fake news

Local government policies can target the reduction of real or imagined barriers. Internet skills training for the unemployed, internet virus and security training for retirees, good practices for general internet browsing engagements and emails, and Skype and Zoom training for people whose relatives have left the area, can all work positively for groups within society. All require internet access and thus ICT infrastructure. Interviewees recognised that local governments could organise classes for business leaders on how to install online payment systems on webpages, perhaps as a side initiative in a local group meeting of business people. Local government service providers could listen out for additional needs of their communities and respond to the needs of the local communities by setting up, facilitating, and/or providing on-demand services and education facilities. There was a strong narrative that improvements in knowledge would 'correct' reasons for non-engagement. Roles for government include emphasising the benefits of engaging with, strengthening and enhancing levels of trust in the digital system, and fulfilling the need to highlight the ease of protecting personal and financial information.

Concerns arise over the spread of fake news (Kant, Varea 2021, Talwar et al. 2019). A lack of trust in internet security and with the DE are commonplace but appear to improve with higher levels of experience and digital engagement. Underlining the perception of trust are the not infrequent discussions in the media of the presence of fake news, some of which are associated with some very high profile internationally known celebrities. The presentation of information as news that is later found to be false or misleading undermines the confidence people have with digital platforms as well as the perceived value of engaging with the DE. When the importance of fake news was discussed, there was an unmistakable recognition that fake news can mislead sections of society, undermine the path forward for society, and/or weaken the levels of trust that sections of society have in the DE. There were concerns that as sections of society increasingly engage with the digital economy the levels of engagement recede in other sections of society. The engagement gap grows, intensifying disparities in opportunities and compounding inequalities between those receiving benefits from engaging with the DE with those that do not.

Interviewee discourses that touched on this topic were based on the narrative that fake news is an inevitable ill of society and that society needs to recognise this, accept it, and move on by ensuring that any damaging and divergent effect is quashed, but that the digital platform is no different from other media platforms in this respect. Nevertheless, policymakers need to be cognisant of particular sections of society being left behind as a result. Drawing parallels with other parts of everyday life was emphasised as a plausible way forward to alleviate any fears while also ensuring that individuals remain alert to the possibility of fraudulent activities.

4.7 Digital ecosystem of connected individuals

Although all interviewees saw the DE as a juggernaut that policymakers and various communities should climb aboard and reap the rewards from early engagement, there was a further view that the whole social economy is intricately connected through ICT infrastructure. In this respect, it is vital to continually update that infrastructure to ensure connectivity and facilitate continued growth. At the same time, it was also

recognised that this ecosystem is constantly in flux, with new gaps and connections emerging while old ones disappear into obscurity. Some interviewees perceived that only the most agile communities will be at the forefront of the DE, with most communities always playing catch-up due to missed opportunities, which also reflects the rest of society. Fewer missed opportunities translate into more dynamism in the DE, with knowledge, skills, and experiences accruing in a continuous cumulative process.

Some interviewees voiced the importance to local communities of informed and respected intermediaries that bring them new digital knowledge. These respected intermediaries translate digital information into a form that benefits their community, illustrate to others the benefits of engaging with the DE, highlight the ease of prioritising and updating aspects of digital knowledge and skills, and lead by example. These trusted intermediaries are recognised as being important for the future development of a local economy by local layers of government who then purposefully integrate activities of respected intermediaries into their portfolio of activities. Not all areas have an equal supply of respected intermediaries, and this aspect of the DE narrative was not discussed, but may affect the spatial spread of benefits of the DE. Some interviewees voiced the need to share roles and responsibilities with engaged local community members, where available. These roles and responsibilities will be ones that enhance the size and effectiveness of the local DE participants while also increasing their connectivity with the outside world.

Scarce resources are a major reason for the lack of provision of DE training opportunities. There is the need for local government and influential development bodies from across the world to think and act smarter to enhance the engagement of their local community members to strengthen the resilience of their local economies by increasing connectivity with the wider DE. Consistent with other areas of the economy, the narrative underpinning investments in the DE emphasise that some areas will prosper from greater engagement and there will be opportunities for those left behind places to accelerate and catch up. However, the narrative is currently underemphasising the gaps and potential problems of being left behind in an increasingly online world; this aspect of the economic divide will exhibit spatial and social red flags.

5 Conclusions

The narrative of the digital economy was explored from different perspectives and interviews with policymakers, stakeholders, and academics revealed an overwhelming positive bias. This paper explored the reasons why different individuals advocate the prioritisation and development of the DE. This knowledge is crucially important for astute commentators and for advocates of continual investment in the digital economy should interest wane in support for further prioritisation and development of the digital economy.

The overarching aim of this research was to increase understanding about how local government can use the DE to enhance the wellbeing and life satisfaction of its residents while supporting their local economy. This research put digital engagement at the heart of local economic policymaking and initiatives to gain maximum traction. In this way, it sought knowledge that would enable fundamental change in the way local governments use digital technologies to enhance the wellbeing of their inhabitants. The voiced perspectives emphasised an overwhelmingly positive and diverse set of reasons for continued investments in ICT infrastructure but with much less recognition of the costs.

An important finding is that although proponents for continued investments in DE infrastructure ground their perspective on different issues, they currently align to collectively strengthen the case for further investment, including digital investments to enhance infrastructure and connectivity, investments in equipment to access that infrastructure, investment in education for individuals to both recognise the opportunities and pitfalls, and investments to be able to engage as actors in the DE. We identified seven distinct issues of concern, however, that are evolving in importance at different rates, that affect different groups of people, different communities, and have different consequences, but currently those issues are considered relatively minor in comparison to the perceived benefits. If those separate causes of concern grow in stature, then the coalescing narrative for greater DE investments may become undermined and deprioritised. This may be the

case when different advocates are more cognisant of the benefits for different society groups, such as the marginalised, less-educated, rural, or older proportions of society, or parts of the economy that appear to benefit less, such as low growth firms. Disagreements about who are or should be prospering from DE investment may strengthen and the need for further investments to benefit particular groups may wane. Hence, this study contributed to theory by demonstrating that policy decisions can draw on diverse narratives and multidimensional understandings but still coalesce on the same policy recommendation.

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